



MAY, 1948

ROCK PRODUCTS

THE INDUSTRY'S RECOGNIZED AUTHORITY



VOL. 51, No. 5

Ralph S. Torgerson
Managing Editor**Bror Nordberg**
EDITOR**Nathan C. Rockwood**
Editorial Consultant

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David Mocine, Associate Editor
M. K. Smith, Assistant Editor
J. Sedlack, Assistant Editor

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ROCK PRODUCTS is published monthly by MACLEAN-HUNTER Publishing Corporation, 309 West Jackson Blvd., Chicago 6, Illinois; Horace T. Hunter, President; John R. Thompson, Vice President; J. L. Frazier, Secretary. Copyright, 1948. Entered as second-class matter, Jan. 30, 1936, at the Chicago, Ill. post office under the act of Mar. 3, 1879. Additional entry at Milwaukee, Wis.

SUBSCRIPTION INFORMATION

Subscription Price: United States and Possessions, Canada, one year, \$2.00; two years, \$3.00; three years, \$4.00. Pan American, one year, \$4.00; two years, \$7.00; three years, \$10.00. All other foreign, one year, \$6.00; two years, \$12.00; three years, \$15.00. Twenty-five cents for single copies. Indexed in the Industrial Arts Index. Canadian subscriptions and remittances may be sent in Canadian funds to ROCK PRODUCTS, P. O. Box 100, Terminal "A," Toronto, Canada.

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"WE HEAR..."

May, 1948

Large tonnages of waste slate which have accumulated over the years may be put to some use if the research suggestions of the Penn State College Experiment Station are carried out. One of the products is a new type brick formed by mixing ground slate and hydrated lime, the mixture being pressed to any size and shape for use as a building material. Other uses include its conversion by melting to mineral wool or by heat-treatment to produce an expanded, lightweight concrete aggregate.

* * * * *

Small houses having two or three bedrooms, living room, bathroom, and kitchen can be built and financed for less than \$4000, according to the Federal Housing Administration. These houses have been built in Arizona, in the Detroit area, and Tennessee by mass production methods.

* * * * *

Manufacturers of prefabricated houses operated at about 25 per cent of capacity last year, turning out 37,000 homes, states a release of the Prefabricated Home Manufacturers Institute. This was due in large part to material shortages and dealer uncertainties. In 1948, it is planned to manufacture 60,000 houses.

* * * * *

To alleviate the domestic shortage of high-grade bauxite, three separate laboratory procedures have been developed by the Bureau of Mines for producing iron-free alumina from low-grade bauxites and clays.

* * * * *

Highway building costs are moving down from the peak recently reported, according to the Texas Highway Department. Average unit prices of projects bid upon in January, 1948, were 40 per cent below the post-war peak of July, 1946. However, the average remains 30 per cent above 1940 levels. The Texas Highway Commission recently asked for bids on an estimated \$7,550,000 for construction jobs, including 350 miles of road in addition to bridges, widening and surfacing.

* * * * *

Coal output which had been up to over 13,000,000 tons per week dropped below 2,000,000 tons per week during the strike seriously curtailing steel production which had been operating at a peak of 95.7 per cent of capacity.

* * * * *

To meet the anticipated college enrollment in 1950, the U. S. Office of Education estimates that a 78 per cent expansion in college and university buildings will be required to accommodate the students. At 1948 prices, the cost of these buildings is placed at \$2,650,000,000, not including land and equipment.

* * * * *

A three-year extension of the Federal Aid Roads Act was approved recently by the House Public Works Committee. The legislation would provide \$500,000,000 of federal-aid funds for highways for each of the fiscal years 1950, 1951, and 1952.

WE HEAR

Catholic institutions have plans for building and remodeling projects exceeding \$100,000,000 during the next three years, states the Very Rev. Henry A. Lucks, one of the sponsors of the National Catholic Building Convention and Exposition to be held in Chicago at the Stevens Hotel, June 30 to July 3.

Over a thousand new products and services were revealed in a nationwide survey of manufacturers compiled into an 80-page "New Products" booklet by the New York Journal of Commerce. More than 750 different concerns are listed in this compilation along with a detailed description of the new products which they plan to introduce. Copies of this booklet can be obtained at 50 cents each by writing the New York Journal of Commerce.

An estimated \$1,154,000,000 was expended in 1947 for highway construction throughout the United States, according to Public Roads Administration figures.

Estimates, based on a survey made by the American Association of State Highway Officials, indicate that a \$22,000,000,000 construction program is needed to bring the 600,000-mile federal aid highway system up to modern traffic design. If a 10-year program was undertaken, it would require a yearly expenditure of \$2,492,000,000.

Employment remained "fundamentally steady" in February and early March, states the Bureau of Labor Statistics, Washington, D. C. However, industrial employment declined 275,000 in February from January, dropping to 42,700,000 employed in non-agricultural jobs. The declines affected particularly the construction industry and the automobile industry, and were due to severe weather in many parts of the country along with gas and oil shortages. The fuel shortage caused temporary unemployment of 90,000 persons, mostly in the Detroit area in the automobile industry in February.

Development of a silicone sponge was recently announced by The Connecticut Hard Rubber Co., New Haven, Conn., which is said to have several advantages. Its properties, including flexibility, remained unchanged in variations of temperature from minus 70 deg. F. to 500 deg. F. It is suggested for use as a vibration dampener and as a furnace seal. This is another product which basically comes from silica.

The National Labor Relations Board will not recognize a "union shop" election if the agency itself does not supervise the voting.

Construction contract awards in the United States for the week ending March 25 reached the second highest weekly volume this year to date, according to Engineering News-Record. The total for civil engineering construction was \$137,910,000, second only to the first week of March, when \$183,872,000 was recorded. Total construction volume in 1948 to March 25 was \$1,424,694,000, an increase of 20 per cent over the like 1947 period.

Kentucky's constitutional amendment appropriating all motor vehicle usage taxes and license fees to the state road fund, passed in 1945, resulted in the largest cash receipts in the Department's history for the fiscal year ending March, 1947.

The Wage-Hour Administrator has published a proposal to reduce the time for which employers must preserve pay-roll data. As now required by the Fair Labor Standards Act, these records must be kept for four years, but under the new proposal it has been proposed that this period be reduced to three years.

THE EDITORS

Ultimate Effects of Freight Rate Increases

THERE is no denying that the rock products industries have been holding the price line far better than most industry. Mounting costs of labor, materials and fuel have been offset remarkably well by producers of non-metallic minerals, as revealed by comparisons with price trends for other commodities. This has been accomplished by improved operation resulting from more mechanization, through elimination of wasteful practices, more effective organization of personnel and processing, and because of extraordinary high levels of production. For many concerns, capacity operation is requisite to any profits at all.

Those companies that have been ploughing back capital into plant modernization at the expense of reasonable profits, or dividends to stockholders, have gone about as far as they can to hold down costs.

Rehabilitation of plant and methods has been in fair competition to outdo each other and the consumer has benefitted, but much of the good that has been accomplished is being nullified through very substantial increases in railroad freight rates. The inspiration to strive for even greater economies in order to effect low selling prices is suffering because of threatened further rises in shipping rates.

In proportion to the levels of freight rates and how rate increases are applied geographically or by zones, unfair competitive barriers are set up between producers that cannot be met by improved productivity in existing operations; for others, where the net effect will be a more or less uniform increase in price schedules the threat is loss of markets to competitive interests or materials.

Freight Rates Exceed Product Value

Even before imposition of the latest of several increases in railroad transportation costs, certain state highway departments and other large purchasers actively were studying ways and means to combat increasing costs of building materials, which were considered as out of line because of high delivered prices. The fact that a producer has a favorable plant price, of course, makes little difference when prices at destination are two or three times the value of a product.

One of the large southeastern states has publicly announced that consideration is being given to the use of more local aggregates, a practice which that state normally would not condone, and is planning the development of new types of pavements to employ less costly materials. One of the effects of high delivery rates could well result in the unwise use of inferior materials and a sub-standard end product that will not endure for long.

A dropoff of some ten per cent in the comparative tonnage moved by rail, with proportionate increase in that hauled by trucks, the last four years, is indicative of the trend the aggregates industry may be forced to follow at an accelerated pace should recently-requested freight rate increases of some 30 per cent be granted. Markets would be narrowed further geographically through restrictions on length of haul for the heavy commodities that in many cases are worth less than their freight.

Producers with large capital investment tied up in plant can look forward to loss of part of that volume of sales so necessary to near peak operations, which today is proving essential to any profits at all for many companies, in meeting current price levels. There is no question that the result of still higher transportation costs will be the diversion from these operations of increasingly greater tonnages to roadside crushed stone plants and gravel pits that are served by trucks.

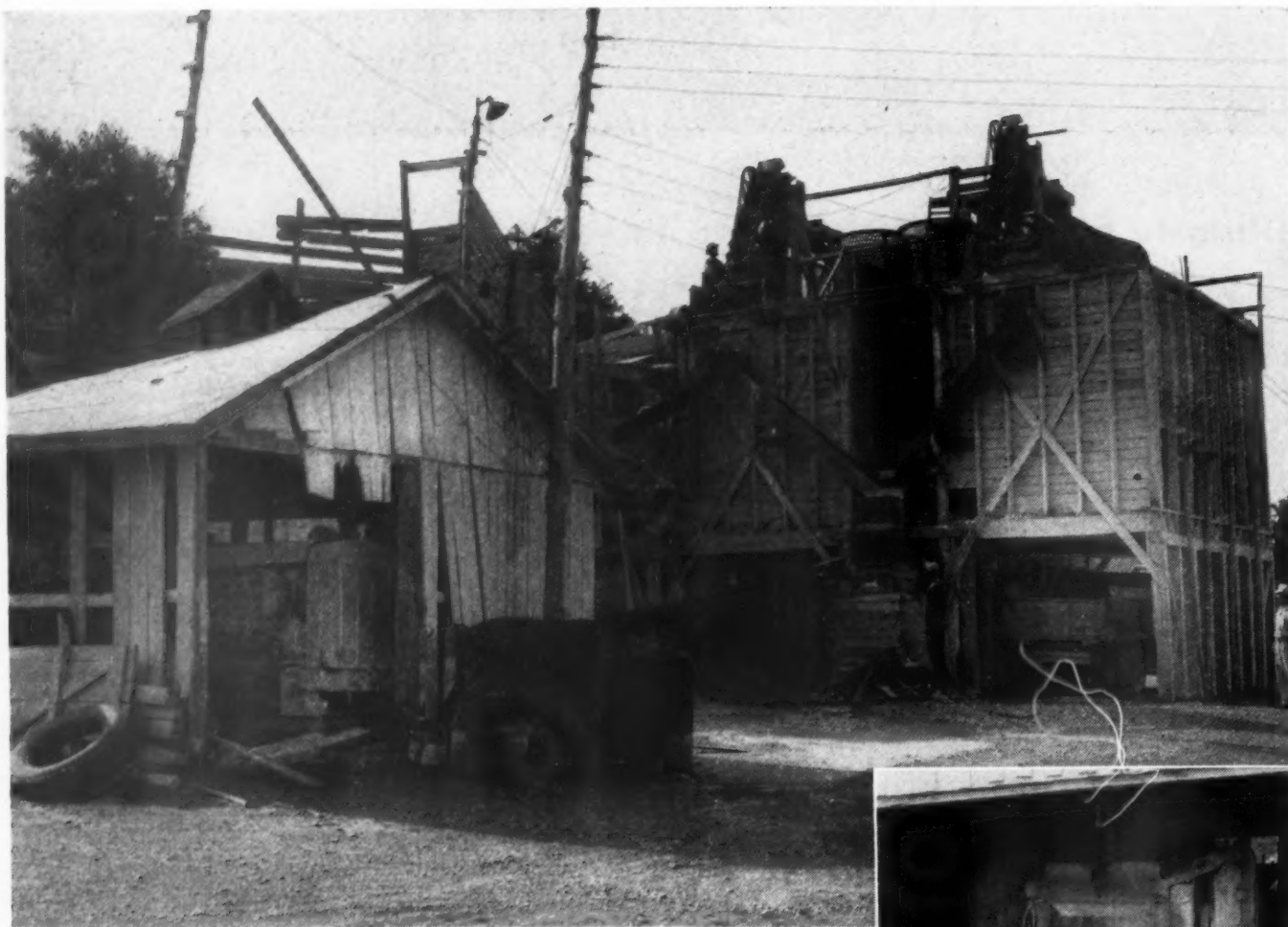
Decentralization-Portability

The very destiny of the aggregates industry may be affected for years to come because delivered prices are being forced to new highs. Present concepts as to how to design and build plants and where to locate them will be changed; and it isn't inconceivable that the industry may find a solution in portable plants as a means to eliminate forever revenue to the railroads.

Decentralization is developing but represents only a partial solution and one not always adaptable. The portland cement industry has experienced economies in operating large centralized mills that preclude operating small capacity plants in local market areas, but maybe freight rates will sometime swing the balance. Several large capacity cement mills are being built or planned for construction in markets purely because outlets are being threatened as a result of mounting transportation costs, and there will be a lot of development in the establishment of storage-packing plants near major markets in order to extend shipping radii. Gypsum plants and other operations not too restricted by available sources of raw materials are finding new locations.

The railroads, to preserve their own markets, might well give special consideration to the large volume, low value goods in establishing new rate structures.

Bror Nordberg



Albany, Ky., No. 2 Plant of Caldwell Stone Co., Danville, Ky.
Two "Caterpillar" D13000 Engines power Pioneer crusher.



Fifteen years of steady work is the record of this veteran "Caterpillar" Diesel at Albany, Ky., No. 1 Plant.

"We hardly know we've got 'em" —says the foreman

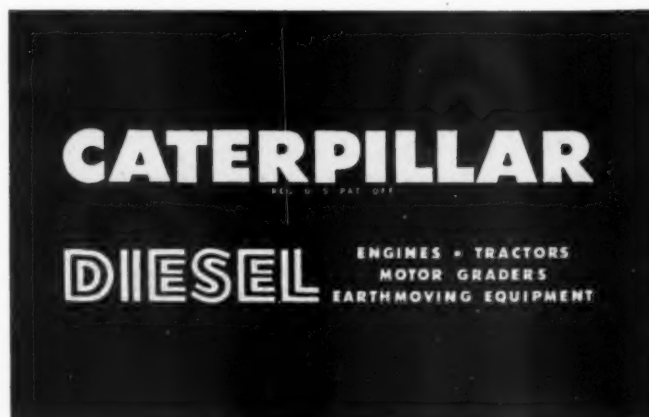
- Two Albany, Kentucky, plants of the Caldwell Stone Co. produce a total of 1500 tons of crushed limestone as a daily average. At each plant there are two "Caterpillar" Diesel Engines powering the crusher, elevator and screens.

- One of the engines at the No. 1 Plant is among the earliest "Caterpillar" Diesels ever built—a D9900 that has been on the job for 15 years! Too old to have an hour meter, it operates 9 hours a day, 6 days a week, the year 'round, and never gives any trouble. At a conservative estimate, this old-timer has done between 30,000 and 40,000 hours of hard work, and it's still going strong.

- The two "Caterpillar" Diesel D13000 Engines at the other plant are not as venerable but they're doing

all right, too. Says Foreman W. H. Higginbotham: "They just sit there and hammer away with no effort at all. We hardly know we've got 'em. We certainly are more than satisfied."

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS



Rocky's NOTES

Nathan C. Rockwood

"The Technology of Fine Particles"

PROBABLY FEW READERS recognize the term "Micromeritics,"* the title of a book, the subtitle of which is "The Technology of Fine Particles"; yet this is a subject that concerns practically all the rock products industries. It is the field of particles between colloid size and coarse aggregates. Hence it includes most of the particles which go to make up mortar and concrete; but the subject is more comprehensive than that; it includes soil physics—the characteristics of soils for both agriculture and engineering purposes; geology; the deposition of sand, silt and gravel by streams and wind; mineral dressing to limit the grinding or reduction to desired particle size, etc.

Shape and Size of Particles

To give an idea of the nature of the text we will skim over a few chapters, which obviously have a bearing on the technology of the rock products industries. First we have "the dynamics of small particles." This means the mathematical analysis or "laws" of small particles in motion, in fluids and in air (or other gas). The subject includes the separation of particles by hydraulic and dust collection methods. The treatment is quite technical (as is all the rest of the text), but to researchers and designers of equipment, should prove of much value.

Shape and size-distribution of particles is the subject of another chapter. Some industries are mainly concerned with the average or mean size of particles—for example, production of filter sand; others with gradation of particle sizes. Gradation is well recognized in the mineral aggregates industry, where it has been studied independently for many years. It is equally important to portland cement manufacturers, but it has not received the attention it deserves. Related to the shape of particle and size distribution is the problem of packing of particles; too many particles of about the same size prevents close packing. In other words the narrower the size distribution, or the nearer the particles are to a uniform size, the more voids

in the pack; and the finer the particles the greater the difficulty.

One problem in the portland cement industry appears to be how to distinguish between the end results of chemical and of physical properties. In recent years the whole tendency has been toward a finely ground product in order to get more rapid chemical reaction, overlooking perhaps that close packing of the particles is just as important to a satisfactory concrete. "Bleeding" of cement paste has been looked upon as a detriment, and to prevent bleeding has been one of the objects of fine grinding; yet bleeding is evidence of packing of the particles and may actually be a benefit. Cement grains of uniform size would appear to have properties very detrimental in mortar and concrete, provided the hydrated particles retain these physical properties, and there is no reason not to believe that at least most of them do. This is well recognized in establishing properties of fine aggregate but universally overlooked in case of the cement.

The chapter on sieve grading of materials contains much of practical interest. The tables of screen meshes and the comparative openings of United States standard sieves and British and German standards are very helpful to those who extend their reading into foreign literature. The discussion of sieving efficiency is helpful practically, for while it concerns only laboratory test sieving, it shows how impossible it is to get comparable or efficient results even here. Using a sample of sand containing 50 per cent oversize and 50 per cent undersize, tests showed that "the maximum amount of material sieved through any series of screens during a given interval of time does not follow any definite law. The figures also indicate that insofar as the relative efficiencies of the various methods are concerned, vibratory motion is first (provided the best combination of amplitude and frequency is used), followed by side-tap (hand) motion, bottom-tap (hand) motion, Ro-Tap (with hammer) motion and Ro-Tap (without hammer) motion."

This statement has significance in our industry. First, where a testing

laboratory makes a screen analysis of your material, you should know the type of testing sieves used, for the difference in results may be as much as 30 per cent. Another conclusion developed is that by varying frequency and amplitude, it was proved that amplitude of vibration has a much greater effect on the rate of screening than frequency of vibration. It follows then that manufacturers of commercial vibrating screens, who use a more or less standard frequency for fine screens, are on firm ground. The same test results mentioned also show that a thick bed of material on the sieve gave approximately 25 per cent less throughs than a thin bed. It must be remembered that these conclusions are based on laboratory test sieving of dry sand, but probably are indicative of what commercial screens do.

There is, so far as test sieving is concerned, a combination of amplitude and frequency of vibration which gives maximum results for each size of material. For example, for a 14- to 20-mesh size an amplitude of 0.60 mm. and a frequency of 580 v. per min. is best; and for 65- to 100-mesh, 0.20 mm. amplitude and 1700 v. per min. is best. There is also a table which compares the effectiveness of various test sieve motions on the different sizes of sand, screened for 2 min. The greatest difference is 29.5 per cent for 20- to 28-mesh sand between a Ro-Tap (with hammer motion) and a vibratory motion. It is well to know these differences, for it explains why laboratory screen results often depart widely from plant screening results.

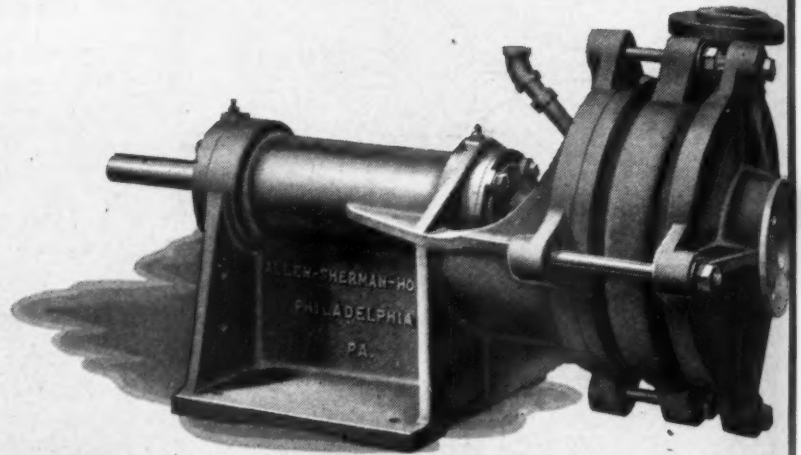
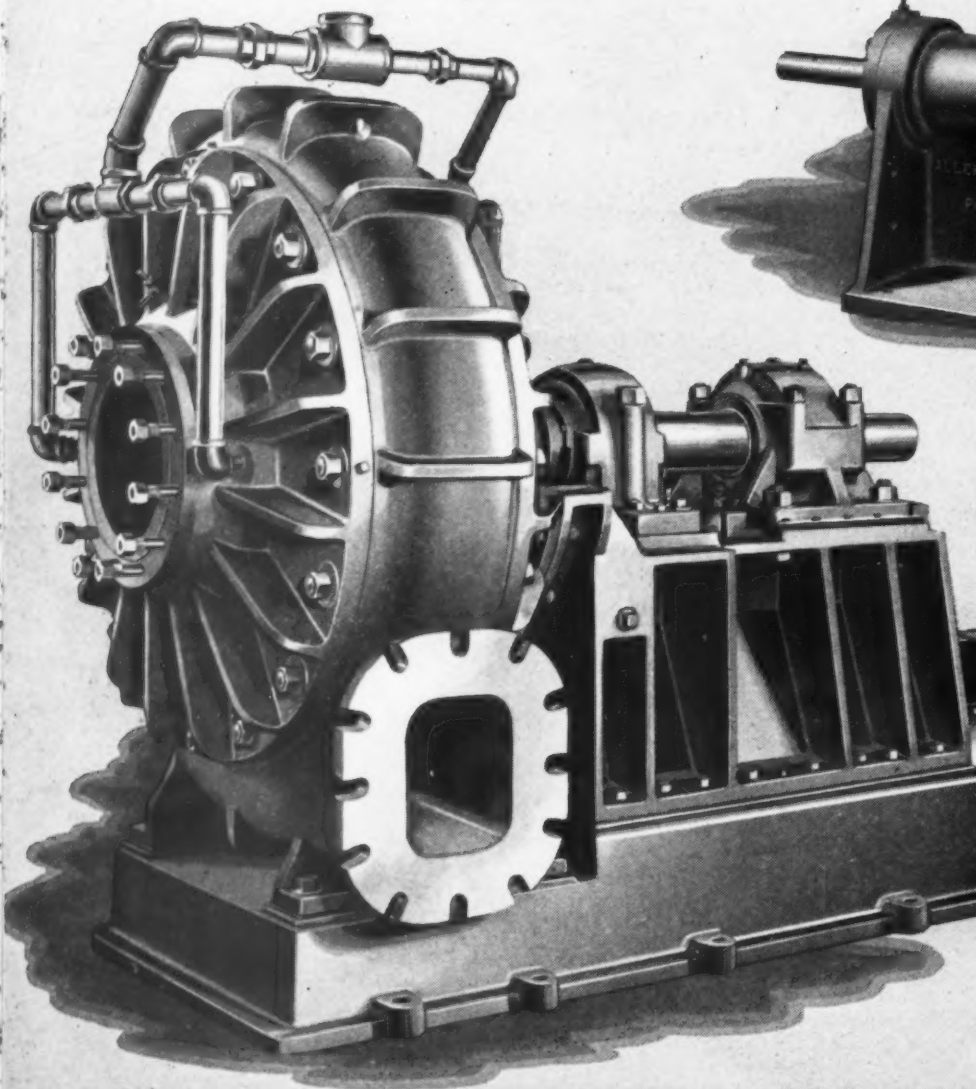
Fine Grinding

There is only one other chapter we have space to touch upon here—on the theory of fine grinding. The subject is one with which interested readers in the rock products industry are already familiar, and this chapter is of interest chiefly in summarizing recent results of many investigators. There is a special warning against too great speed of ball mills: "Too much emphasis cannot be placed on the fact that the peak of a power curve comes at a lower speed than that which centrifugalizes the outermost layer of balls. It may be shown that the power peak comes when the outer circle of balls reaches the breast of the mill, in what is called the eight o'clock position."

Slurry handling and dust collecting problems of portland cement and other industries are treated at length and mathematically analyzed. While the book undoubtedly contains a great deal more mathematics than the average technical man in the rock products industry can grasp without going back to his college textbooks, there is, as we have attempted to show, much of very practical value sandwiched in between formulas of algebra and calculus. We cannot conceive of anyone engaged in research in the rock products industry not having this volume in his reference library.

*"Micromeritics, the Technology of Fine Particles," by J. M. DollaValle, second edition, 1948. Pitman Publishing Corp., New York and London; 555 pp., \$8.50.

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**WEIGHT
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Hydroseal Pumps are built in eight standard sizes with a capacity range from 10 G. P. M. to 12,000 G. P. M., the smallest and largest being illustrated. No matter what your job may be in abrasives materials pumping, from filtrate or the finest slurries at heavy concentration up to boulders 6 inches in diameter, the economies of Hydroseal and Maximix are obtainable in standard construction. Hydrosealing saves $\frac{1}{3}$ to $\frac{1}{2}$ in power costs. Maximix Rubber outlasts equivalent metal parts 4 to 6 times. Sand and Slurry Type pumps are completely lined with Maximix; Dredge Pumps are Maximix Protected. Send for our new Catalog No. 347.

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the *Personal Side* of the news

Unusual Hobby

H. X. ESCHENBRENNER, president, Universal Concrete Pipe Co., Columbus, Ohio, has a hobby called "Pipe



H. X. Eschenbrenner

Dreams," which is a "little magazine of American philosophy and good cheer" put out by the company. "Hec," as he is known to everyone, is managing editor and devotes all of his spare time to this publication. He was born in Jemappes, near Mons, Belgium, and later came to this country with his folks, living in New Kensington, Penn. After graduating from grammar school, he attended business college in Clarksburg, W. Va. He worked for a while in the county clerk's office and kept books at night for the Biddle Concrete Co., Clarksburg, becoming president of the firm at the age of 21. He also became secretary of the Rotary Club and the West Virginia Lumber and Building Supply Dealers Association. In 1921, he founded the Universal Concrete Pipe Co. at New Martinsville, W. Va., later moving the company's headquarters to Columbus, Ohio. The company now operates plants in 15 cities and eight states. There is also a subsidiary, the Concrete Pipe Co. of Ohio, which has branches in Ohio and Pennsylvania.

Research Manager

HARRY J. KIRK, who for a number of years has been manager of the Highway Contractors' Division of The Associated General Contractors of America, Inc., Washington, D. C., has been appointed manager of the new Research Department. Mr. Kirk will continue as safety director, and will devote a greater portion of his time to accident prevention work. The princi-

pal purposes of the Research Department will be to study and correlate information on contract documents and specifications; uses and cost of owning construction equipment; and construction statistics. ARCHIE N. CARTER, associate editor of *Engineering News-Record and Construction Methods*, will succeed Mr. Kirk as manager of the Highway Contractors' Division. Mr. Carter will also act as co-secretary of the Joint Cooperative Committees between the A.G.C. and the American Association of State Highway Officials and the National Association of State Aviation Officials. He is a member of the American Society of Civil Engineers, and is serving his second year as secretary of the Washington Society of Engineers.

Lime Works Officers

WARREN LEWIS has been elected president of the Longview-Saginaw Lime Works, Inc., Birmingham, Ala. MALONE MOORE has been made vice-president and treasurer; IRWIN EHL-MANN, secretary; and E. M. SNOW, plant manager. MRS. GEORGE A. BREWER is chairman of the board of directors.

Sales Manager

FRANK J. CAIN, JR., sales representative in North Carolina for the Giant Portland Cement Co., Philadelphia, Penn., has been appointed sales manager of the subsidiary, Carolina Giant Cement Co., Harleyville, S. C., former government-owned alumina plant which is being converted to the man-

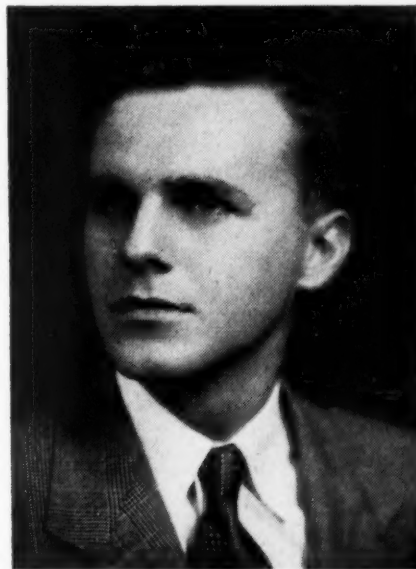


Frank J. Cain, Jr.

ufacture of cement. Upon completion, a sales office will be opened in Columbia, S. C., from which Mr. Cain will direct sales in North and South Carolina, Georgia and Florida.

Named Assistant

KENNETH E. TOBIN has been appointed assistant to Vincent P. Ahearn, executive secretary of the



Kenneth E. Tobin

National Sand and Gravel Association, Washington, D. C. Mr. Tobin attended high school in Detroit, Mich., and Silver Spring, Md., and finished three semesters in the School of Foreign Service, Georgetown University, before entering the Army in April, 1943. He served with the 30th Inf. Div. and 102nd Inf. Div., in France, Belgium, Holland, and Germany. He was wounded and captured in January, 1945, behind the enemy lines, and liberated the following May. Upon his return to the United States he finished his army career instructing advance training on pillbox assault, being discharged on November 30, 1945. Mr. Tobin was awarded the Combat Infantry Badge, Purple Heart with Oak Leaf Cluster, Bronze Star, and Silver Star. He returned to Georgetown University in January, 1946, where he received his B.S., and entered Graduate School, completing one semester of graduate work before leaving school in February of this year.

General Superintendent

EDWARD RENNEN, master mechanic at the Egypt, Penn., plant of the Giant Portland Cement Co., Philadelphia, Penn., has been appointed general superintendent of the plant. He will succeed Donald E. Koch, vice-president in charge of production, who has been transferred to the new plant in Harleyville, S. C. Mr. Renner started with the company in 1920 as an apprentice machinist and worked his way upward to master mechanic.

P.C.A. Appointments

A. M. DAVIS, district engineer in charge of the Lansing, Mich., office of the Portland Cement Association, Chicago, Ill., has been appointed manager



A. M. Davis

of the Midwestern offices, succeeding Carl D. Franks who was recently elected vice-president for promotion. J. GARDNER MARTIN, structural engineer in the Detroit office, has been named to succeed Mr. Davis as district engineer in charge of the Lansing office. Mr. Davis joined the staff of the Association in 1927 as a field engineer in the Indianapolis office, and was successively assigned to western Kentucky, Fort Wayne, and South Bend, Ind., before taking charge of the Lansing office. He is a member of the Michigan Engineering Society and the Engineering Society of Detroit, and holds a Bachelor of Science degree in Civil Engineering from Purdue University, where he graduated in 1923. He is also a member of the American Concrete Institute. Mr. Martin, before joining the staff of the Association in 1936, had held engineering positions with the Bridge Division of the Michigan State Highway Department and the Detroit Department of Water Supply. He received a Bachelor's degree in Civil Engineering from the University of Detroit in 1927, and a Civil Engineering degree in 1933. He is a member of the Engineering Society of Detroit, the Michigan Society of Professional Engineers, the American Society for Testing Materials, and the American Concrete Institute.

Wins Award

HARRY E. CARNEY, JR., president of the Carney Co., Inc., Mankato, Minn., has been named winner of the "Book of Golden Deeds" award, presented annually by the Mankato Exchange Club to the person who has rendered the most outstanding and unselfish service to his fellow citizens. This

award was originated in 1917 by the National Exchange Club and has been made annually by the Mankato chapter since its origin in 1938.

Sales Manager

F. V. CLICQUENNOI has been appointed Western sales manager for Lehigh Portland Cement Co., Allentown, Penn., succeeding T. L. Hughes who has retired. Mr. Clicqueno, who is making a tour of the plants located in Missouri, Arkansas, Oklahoma, Texas and Kansas, was recently a guest at a banquet in Iola, Kan., given by officials of the company and the Iola plant. C. A. Swiggett, superintendent at the plant; C. E. Harris, chief chemist; Gerald Buss, chief clerk; R. S. Waterbury, traffic manager; and Dewey Fullington, district sales manager, attended the banquet.

Plant Manager

CLAUDE McMILLAN, assistant superintendent at the Ada, Okla., plant of the Ideal Cement Co., Denver, Colo., has been promoted to plant manager at Okay, Ark., where he will have charge of production planning, relationship with sales department, contacts with railroads, plant construction, modifications, etc. M. M. COLLINS will continue as plant superintendent, carrying out actual production schedules as authorized by Mr. McMillan.

Named Directors

LEWIS R. SANDERSON, vice-president in charge of operations of the National Gypsum Co., Buffalo, N. Y., and DEAN D. CRANDELL, vice-president in charge of sales and advertising, have been elected directors of the company. They replace Gordon H. Tarbell, who has retired, and Ralph F. Burley, who is on leave of absence because of ill health. Melvin H. Baker and all other officers and directors were reelected.

Assumes Presidency

LENDALL P. WARRINER, consulting mining geologist, has given up his office in Toronto, Canada, to become president of the Appalachian Minerals Co., Monticello, Ga., producers of feldspar, mica, and other minerals.

Appointed Commissioner

H. A. SAWYER, vice-president of the Louisiana Division of the Lone Star Cement Corp., New York, N. Y., has been appointed commissioner of the Dock Board of New Orleans, La., succeeding A. B. Freeman.

Lone Star Appointment

ARTHUR L. CURTIS has been named assistant sales manager, Indiana Division, Lone Star Cement Corp., Indianapolis, Ind.

25 Year Awards

BONNER SPRINGS (Kan.) plant of Lone Star Cement Co., New York City, in a recently held safety meeting, presented watches to five employees who had passed the 25-year mark in their service with the company. Mark Small, vice-president, presented watches to J. A. Lehaney, vice-president, retired; Homer Griffith, chief chemist; Charles Kierns, mill foreman; and Walter Frost. Mrs. Earl Clark was also presented with a watch posthumously in honor of Mr. Clark.

Mr. Griffith has been in the cement industry since 1919, starting with the Bonner Springs company before its sale to Lone Star Cement Co.

Joins P.C.A.

R. L. BARRETT, formerly structural and mechanical engineer for C. H. Johnston, St. Paul, Minn., architects and engineers, has joined the staff of the Portland Cement Association as field engineer for the southern Minnesota territory. He succeeds H. C. Leibe who has retired.

Engineering Director

JENS C. HOLM, industrial engineer and cement production specialist, has been appointed director of engineering for the Marquette Cement Manufacturing Co., Chicago, Ill. Mr. Holm had been associated with F. L. Smith and Co. of Copenhagen, Denmark, for the past 12 years, and had engineered the construction and supervised the production of cement plants in India, Ireland and New Zealand before undertaking similar duties in this country.



Jens C. Holm

A. F. Miller, who for 20 years has been engineering consultant and temporarily occupied the position of chief engineer, will continue in a consulting capacity.

Works Manager

JOHN M. GAROUTTE, works manager at the alumina plant of Permanente Metals Corp., Baton Rouge, La., has



Henry J. Kaiser, left, and John Garoutte, taken at Moss Landing plant

been appointed works manager of the Permanente cement plant at Permanente, Calif. HOWARD CHURCH, who has been conducting special development and research work at the Baton Rouge plant, will succeed Mr. Garoutte as works manager at that plant. Mr. Garoutte joined the company in 1940 as engineer in charge of ironwork construction for the lime, sugar rock, and batch plants. He participated in the construction of the magnesium plant at Permanente, and then moved to Permanente Metals Corp. plants at Moss Landing and Natividad, Calif., where he was project engineer and general superintendent of both operations. He was then assigned to start operations at the Baton Rouge works, and recently completed supervision of a million-dollar dock project at that plant. Mr. Church was previously located at Permanente as magnesium plant superintendent during the war, and was transferred to Baton Rouge last year to conduct special development and research work.

Appointed Chairman

EDWARD INGLESBY, National Gypsum Co., Buffalo, N. Y., was appointed chairman of the attendance and registration committee for the annual Western New York Safety Conference, held April 13 and 14 at Niagara Falls.

U. S. C. of C. Candidate

FRANK L. CHRISTY, president of the Marietta Concrete Corp., Marietta, Ohio, is one of four Ohio candidates for membership on the board of directors of the United States Chamber of Commerce.

Foundation Director

DR. HALDON A. LEEDY, chairman of physics research at Armour Research Foundation of Illinois Institute of

Technology, has been named acting director of the foundation. He succeeds Dr. Jesse E. Hobson, who has resigned to accept the directorship of the Stanford Research Institute.

Named Director

THOMAS GRAHAM, president of the Bankers Bond Co., has been elected to the board of directors of the Ohio River Sand Co., Louisville, Ky., to replace William Furlong. Other directors named are: President J. H. Duffy, vice-president James T. Duffy, Isaac Hilliard, Alvin P. Bohmer, Chester A. Rankin and H. P. Caldwell.

OBITUARIES

JOSEPH C. PEARSON, retired director of research, Lehigh Portland Cement Co., Allentown, Penn., died unexpectedly at his home on March 16. He was 68 years old and had retired the first of the year after 24 years of service with the company, but continued experimental work and writing on scientific papers. Mr. Pearson was born in Andover, Maine, and graduated from Bowdoin College where he taught mathematics and physics for two years. He received his master's degree at Harvard College. For years he was associated with the Carnegie Institute at Washington, D. C., in the study of terrestrial magnetism. He followed this with a 14-year period of materials testing research with the National Bureau of Standards in Washington. Through his work with the Bureau he became associated with Lehigh Portland Cement Co. in 1924 as assistant chemical engineer. He was named director of research eight years later and became known throughout the industry as an authority in the use of portland cement. Mr. Pearson was a member of the American Society for Testing Materials and at one time served as president of the American Concrete Institute.

JOHN E. MAHER, retired manager of the Keystone Builders Supply Co., Rochester, N. Y., died March 7 at the age of 75. He was formerly general manager of the American Clay and Cement Co., Rochester, N. Y., and had been in the building supply business for 57 years. He started at the age of 18 with the Standard Sewer Pipe Co.

EDWARD A. BAGGE, one of the founders and former treasurer of the Cincinnati Cement Products Co., Cincinnati, Ohio, died recently in Santa Monica, Calif., where he had gone to spend the winter. He was 77 years old.

L. RAY GROVER, operator of a limestone quarry near Gallipolis, Ohio, died suddenly on March 13. He was 57 years old and had been ill only a short time.

HERBERT J. BOUGHER, operator of a sand and supply business in Philadelphia, Penn., for 50 years, died March 17 at the age of 76. He was a former secretary of the old J. W. Paxson Co. in Philadelphia, and for the last 17 years was Philadelphia representative for Whitehead Brothers Co., New York, N. Y.

HARRY SHUMOW, co-owner of the Perma-Stone Improvement Co., San Francisco, Calif., died March 16 when a model brick wall he was painting as a display toppled over on him. He was 55 years old.

E. P. (PERCY) LUCAS, president of Superior Portland Cement, Inc., Seattle, Wash., died suddenly at LaJolla, Calif., where he had gone for his health. He was 63 years of age. Born at Topeka, Kan., Mr. Lucas received his early education in Kansas City and at Bayview College in Texas. He joined the Baker River and Shuksan Railway as manager, where he remained for seven years and then became manager of the Eburne Steel Co., Vancouver, B. C. A year and a half later he became associated with the Bellingham Coal Mines, subsequently becoming general manager and president. Later he became associated with the Superior Portland Cement Co. of which he was president at the time of his death. Mr. Lucas is survived by a son, John Lucas, a heart specialist in the Mayo Clinic at Rochester, Minn.

W. L. VAN VALKENBURGH, president of the Blue Diamond Corp., Los Angeles, Calif., died March 24 at his home after a brief illness. He was 57 years of age and had been with the company since 1921.

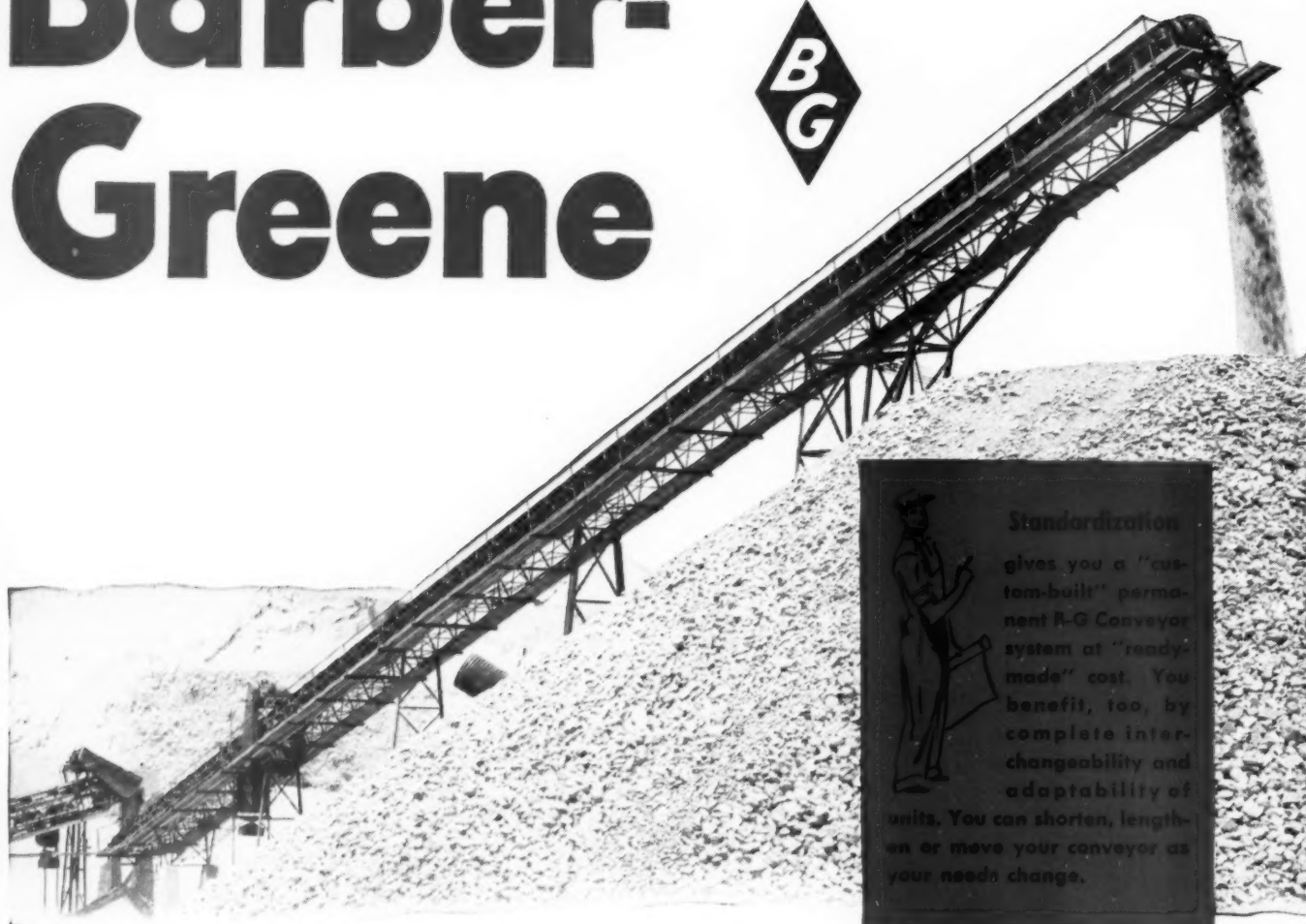
HERBERT P. BRASWELL, president of the Braswell Sand and Gravel Co., Shreveport, La., passed away recently after an illness of only a few days. He was 42 years old. He also had an interest in the Braswell Supply Co., Bossier City, La.

GEORGE ELTON KEENE, head of the Guaranteed Gravel and Sand Co., Mankato, Minn., formerly the River Sand and Gravel Co., passed away recently at his home. He was 89 years old. Mr. Keene was one of the original investors in the River Sand and Gravel Co., and was active in the business until a few days before his death.

WALTER C. CLAPP, manager of the product sales department of the Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J., died March 6 following a heart attack. He was 48 years old and had been associated with the company for 34 years.

WALTER WILSON POWERS, retired phosphate executive and a pioneer in the phosphate industry, passed away recently at the age of 85. Mr. Powers constructed the plant of the Mt. Pleasant Fertilizer Co. at the site of the present Virginia-Carolina Chemical Co., which he operated many years ago.

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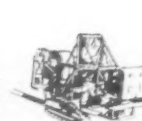
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LABOR RELATIONS TRENDS

U. S. Supreme Court to Pass on "Right-to-Work" Laws

By NATHAN C. ROCKWOOD

THE DECISION of the Supreme Court of the State of North Carolina, in the union building trades case, reported on this page in our March issue, has been appealed to the Supreme Court of the United States, along with a similar case decided by the Supreme Court of the State of Arizona. The U. S. Supreme Court is asked to review the decisions to determine the constitutionality of any state law which prohibits so-called union-security contracts. Both cases involved American Federation of Labor building trades unions, and all the legal talent of the A. F. of L. is taking part in the preparation of arguments, which, however, apparently will be much the same as those presented in the state courts, and there overruled.

In both these State Supreme Court decisions (and more recently the Supreme Court of the State of Nebraska), the courts have upheld the right to outlaw requirement of union membership for a worker to obtain or to hold a job; that the issue is within the police powers of the individual states, which the Constitution of the United States was specifically designed to have retained by the states; that the Taft-Hartley Act itself provides that the states may act independently on this issue. In our opinion this will be one of the most important decisions in many years; it is in the nature of a last-stand fight to retain a fragment of the original states' rights envisioned by the founders of our republic. One of their greatest fears was the assumption of local police powers by the federal government, because, even in that day, they recognized such a step as a step toward ultimate despotism. Many patriots have viewed the establishment of the F.B.I. with misgiving, regardless of the good work it has accomplished.

The A. F. of L.'s petitions for reversal of these decisions are based on arguments that the prohibition of union-shop contracts is "arbitrary, excessive and without rational basis either in the correction of existing abuses or in the protection of any public interest"; that these laws operate to discriminate against organized workers with respect to their ability to achieve an adequate share of the national income and impairs their rights of organization as a part of their constitutional guarantees of freedom of speech and assembly. The A. F. of L. further claims that trade union history has demonstrated the necessity of union-security contracts for protection of benefits won by unions, and that no state should have the right to ban such contracts.

Twelve states already have laws or constitutional amendments prohibiting

closed-shop and union-security contracts. They are Arizona, Arkansas, Georgia, Iowa, Nebraska, Nevada, North Carolina, North Dakota, South Dakota, Tennessee, Texas and Virginia. Because of a recall petition in Arizona to submit the prohibiting constitutional amendment to a referendum vote in November, 1948, the law there is not being enforced in the interim. A similar law is under consideration by the legislature in the State of Mississippi. Other states have laws regulating the methods by which unions may obtain union-security contracts, such as the requirement of a two-thirds vote of the employees.

Arizona Supreme Court Decision

The Arizona case was *American Federation of Labor et al v. American Sash and Door Co. et al*, decided February 4, 1948. The issue arose from the appeal of a lower court judgment upholding the constitutionality of the Arizona state constitutional amendment, which reads as follows: "No person shall be denied the opportunity to obtain or retain employment because of non-membership in a labor organization, nor shall the state, or any subdivision thereof, or any corporation, individual or association of any kind enter into any agreement, written or oral, which excludes any person from employment or continuation of employment because of non-membership in a labor organization." It went into effect November 25, 1946, by proclamation of the governor of the state. The labor organization filed February 12, 1947, a civil action to procure a declaratory judgment in respect to its validity, interpretation and effect, and for injunctive relief against its enforcement.

This case differs from the North Carolina one, reported in our March issue, in that the action was brought prior to the passage of the Federal Labor-Management Relations Act of 1947. Since it made no provision regarding existing contracts, the court ruled that all such contracts were outlawed from February 12 on. This introduced an angle not brought up in the North Carolina case, since it allowed the introduction of the issue of impairment of existing contracts, which might conceivably be a violation of Article I, Section 10 of the Constitution of the United States. This section says: "No state shall . . . pass any . . . law impairing the obligation of contracts . . ." On this point the court was split, with the chief justice dissenting, although agreeing with the other parts of the majority decision.

The State of Arizona already had a prohibition of so-called "yellow dog"

contracts—those by which employers sought to prevent their employees from joining a union. The labor organization attorneys exhibited here the same inconsistency noted in the North Carolina case, wherein they defended the unconstitutionality of such contracts but upheld the validity of union-shop contracts, employing a bit of sophistry which did not escape the court. They argued: "That if a law which prohibits an employer from denying employment to a union member is invalid, then the converse is true, and this amendment of the Arizona constitution which prevents an employer from denying employment to a non-union laborer is also invalid"—just a little too clever to trip a court of law.

In addition to the usual familiar arguments about alleged violation of the rights of freedom of contract, freedom of speech and assembly, discrimination, slavery, etc., etc., they did expose their real objection to the law, and all laws like it. They contended that any abuses or injurious practices that may exist in connection with union-shop contracts may be readily corrected by legislation aimed specifically at such abuses without absolute prohibition of union-security agreements. This admission is very interesting. If the leaders of organized labor had admitted its abuses, and themselves had set about to correct these, they would not now be under the necessity of defending labor for violation of such laws as this one.

In this case they defended union-security contracts "as designed to gain job security, protection from discrimination, equality of bargaining power, and the promotion of better working conditions for all employees; that with such agreements in force disciplinary action may be more effectively imposed upon workers to compel their compliance with existing contracts; and that they eliminate jurisdictional strife and result in better labor-management cooperation * * *. Such agreements eliminate 'free riders.' * * * There are no overwhelming evils incident to union-security contracts that can be cured only by prohibitory legislative fiat, * * * which are arbitrary, unreasonable and excessive."

The court, however, referring several times to the North Carolina Supreme Court decision, and to relevant decisions of the U. S. Supreme Court, came to the conclusion that the Arizona constitutional amendment is a valid exercise of the police powers of the state and is not in violation of the Constitution of the United States. The conclusion (in part) reads: "The rights of free speech and assembly remain inviolate. Labor's basic rights to organize into a union, bargain collectively, to strike, and to peaceably picket are not abridged. These things being established, the wisdom and propriety of the legislative action is not for the determination of the courts, but is a matter for determina-

(Continued on page 111)

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INDUSTRY *News*

Propose New Cement Plant in Florida

LEHIGH PORTLAND CEMENT CO., Allentown, Penn., announced in its annual report, plans for construction of a cement plant in Florida. After two years of exploration along the East Coast, the company discovered and recently purchased what is said to be the most extensive deposit of coquina ever to be found in this country. The coquina, a soft whitish limestone, of broken shells and corals cemented together, is massed in three ridges, each six miles long, from 600 to 800 ft. wide, and approximately 40 to 50 ft. deep. The property comprises 9500 acres, and is situated just north of Flagler Beach. Throughout its length it abuts the Florida Intracoastal Canal. Engineering estimates indicate that development of the site will cost approximately \$6,500,000.

The report also stated that the total amount expended by the company for plant modernization in 1947 was \$3,500,000, and covered completion of such major items as \$415,000 for the conversion from rail to truck haul in the quarries; \$310,000 for electric and Diesel shovels at many locations; \$210,000 for the installation of a clinker compeb mill at Fogelsville; \$120,000 for induced draft fans and chains in kilns at Buffalo; and \$125,000 for a new Diesel generator unit at Iola.

Asbestos Products Plant

FIRST ASBESTOS-CEMENT building materials plant in western United States recently has been completed at Redwood City, Calif., by the Paraffine Companies, Inc., Emeryville, Calif. The plant, specifically designed for manufacture of asbestos-cement products, is a fire-proof structure built of the company's product. Asbestos-cement siding, shingles, flat board and corrugated board will be manufactured at the new factory. James E. Holbrook and Ford M. Tussing are vice-presidents of sales and manufacture, respectively, at the new plant.

Western Phosphate Plant

EMPIRE CHEMICAL CORP., Seattle, Wash., is planning to construct two super-phosphate plants in eastern Washington in the immediate future. Exact site has not been chosen, but one plant will be located in the central or eastern part of the state, and the

second near Spokane. These two plants should bring a \$3,000,000 industry to Washington, according to William Anderson, Butte, Mont., company manager. Plans call for making use of the ample power available in the area from either the Grand Coulee or Bonneville dam and rock will come from Montana. Empire Chemical Corp. operates three phosphate rock mines near Butte, Mont.

Expands Silica Plant

PENNSYLVANIA GLASS SAND CORP., Lewistown, Penn., has announced that expansion of its Mill Creek, Okla., silica producing plant will be completed the middle of this year. The silica plant was acquired last September together with indicated extensive silica deposits suitable for manufacture of high quality crystal and sheet glass and for use in the ceramic and chemical industries. A large part of the expansion program which will double the capacity of the Berkeley Springs, W. Va., silica plant was completed in 1947; the remainder of the program, including construction of a new silica pulverizing mill, will be completed this year. Capital expenditures in 1947 were in excess of \$1,250,000.

Purchase Insulation Plant

THERMLITE MANUFACTURING CO., Spokane, Wash., has been purchased by G. T. Ashe, formerly of Piedmont, Calif. The plant, formerly owned and operated by Warren Latham, manufactures and distributes an expanded insulation product. Plans for plant improvement and expansion are now being carried out, according to Mr. Ashe.

27 Million Dollar Expansion Program

NEARING COMPLETION, the 1½ million dollar modernization and expansion program at the Clarence Center plant of National Gypsum Co., Buffalo, N. Y., is but part of the company's total program covering all plants and costing an estimated 27 million dollars. When completed, the Clarence Center plant will contain about 32,000-sq. ft. in the new building. The old buildings, containing 38,000-sq. ft., will be used as warehouse space.

Capacity of the new plant will be an estimated 70 per cent above the old, with a monthly production of 17,000,000-sq. ft. of wall board, lath or sheathing, plus 6000 tons of plaster. Many of the innovations in manufacturing methods are developments of the company's engineering division. It is expected that the new plant will be in full scale production by May of this year. A pilot plant is maintained at the mill, and constant research has developed many new uses for company products.

Quarry Slide

HAYES QUARRY, Bethany, Mo., recently experienced a slide of frozen rock and clay, with some pieces weighing as much as 1000 lbs. The slide covered a ¼-cu. yd. Northwest power shovel, doing an estimated \$1500 in damage. Due to the fact that the slide occurred at lunch time, no one was in the vicinity of the shovel and no injuries resulted. According to Kenneth Kinnison, quarry superintendent, the shovel was recovered the same afternoon and will be rebuilt by insurance money that covered the accident.



Tritoradora del Norte, Monterey, Mexico, operates a Pioneer portable crusher in its 50 t.p.h. capacity plant. Material from the dry Santa Catarina river bed is loaded to 5-ton White and International trucks by a Caterpillar Diesel D4 tractor equipped with an Athey Mobiloader

Expand Montana Operations

IDEAL CEMENT Co., Denver, Colo., plans to expand operations in the State of Montana to the extent of a possible eventual 5 million dollars, Cris Dobbins, vice-president and general manager, has announced. The new project is in keeping with Ideal's current expansion program which has required an outlay of 15 million dollars in the past two years. The entire undertaking, including the plans just outlined, will increase the company's production from 8,000,000 to 12,000,000 bbls. of cement annually.

Immediate steps in the Montana program, involving the expenditure of one-half million dollars in 1948, will comprise reconditioning of equipment already in place at the company's present plant at Trident, Mont. Two kilns with all necessary grinding equipment probably will be installed as the program develops. Capacity will be increased from 850,000 bbls. to 2,000,000 bbls. per year.

Ideal now is completing an improvement and expansion program which includes an entirely new plant in Colorado and one in Utah as well as increased kiln capacity at Houston, Tex., and Okay, Ark. The company also purchased a sinter plant at Mobile, Ala., and converted it to the production of cement.

Charles Boettcher is president of the Ideal Cement Co., and C. K. Boettcher is executive vice-president and treasurer.

Modernize Gravel Plant

AN EXTENSIVE improvement program, designed to provide a capacity of 1000 t.p.h., has been undertaken at the Irwindale Plant, Consolidated Rock Products Co., Los Angeles, Calif. The work consists of the installation of a new 36-in. conveyor, 2300 ft. long, to reclaim raw feed from the Baldwin Park property; extension of the present surge tunnel and installation of a new 1000 t.p.h. Jeffrey vibrating feeder; construction of a new reinforced concrete and structural steel crushing and primary screening structure, and addition of a new 7 ft. and 5½ ft. Symons crusher; also installation of one new 30-in. conveyor from secondary screening structure to top of mill, three new Tyler Hummer screens, and three new sand wheels to manufacture washed plaster and washed concrete sands. Heights of gravel conveyors, bins, and a section of the mill structure will be raised. The whole project is estimated to cost in excess of \$500,000.

Move Headquarters

NATIONAL SAND AND GRAVEL ASSOCIATION, National Ready Mixed Concrete Association, and National Industrial Sand Association have moved their headquarters from the Munsey

Building to 1325 "E" street, N.W., Washington 4, D. C. Offices will occupy the entire seventh floor.

Start Rock Products Firm

WHITE RIVER Limestone Products Co., Pentler's Bluff, Ark., plans to erect a complete limestone processing plant in the near future. Geology division of the Resources and Development Commission estimates that the deposit to be worked contains 65 million tons of recoverable limestone, which the company will process for chemical use, aggregate, railroad ballast and agricultural limestone. The new firm is headed by H. A. Miller, Little Rock.

Mine and Ship Barite

EDWIN L. BECK and his partner are engaged in the mining and shipping of barite 25 miles south of Beowawe,

Nev. Trucks haul the ore to Beowawe from where it goes by train to Berkeley, Calif., to the Yuba Milling Corp. To date, all work has been in an open pit. Preparations are being made for mining two more deposits in the vicinity.

Gypsum, Mica Plants Built in Virginia

U. S. GYPSUM Co., Chicago, Ill., and the Asheville Mica Co., Asheville, N. C., are both soon to be represented by new plants at Norfolk, in the Hampton Roads area of Virginia. U. S. Gypsum Co. recently began operation of a new plaster and plaster-board plant using raw material brought in by ship from Nova Scotia. The plant cost an estimated two million dollars. Asheville Mica Co. will soon occupy a plant costing an estimated \$300,000 to \$400,000.

Coming Conventions

May 12-14, 1948—

National Industrial Sand Association, Annual Meeting, The Homestead, Hot Springs, Va., Semi-Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va., October 20-22, 1948.

June 4, 1948—

Agricultural Limestone Division, National Crushed Stone Association, Directors' Meeting, Edgewater Beach Hotel, Chicago, Ill.

June 21-25, 1948—

American Society for Testing Materials, Annual Meeting and Exhibit of Testing Apparatus and Related Equipment, Book - Cadillac Hotel, Detroit, Mich.

July 8, 1948—

National Crushed Stone Association, Directors' Meeting, The Homestead, Hot Springs, Va.

July 16, 1948—

National Agricultural Limestone Association, Inc.,

Directors' Meeting, Hotel Bismarck, Chicago, Ill.

July 16-24, 1948—

American Road Builders' Association, Exposition of new Construction Equipment, Soldier Field, Chicago, Ill.

September 20, 1948—

National Ready Mixed Concrete Association, Directors' Meeting, The Broadmoor, Colorado Springs, Colo.

September 22, 1948—

National Sand and Gravel Association, Directors' Meeting, The Broadmoor, Colorado Springs, Colo.

October 20, 1948—

American Institute of Mining and Metallurgical Engineers, Industrial Minerals Conference.

February 13-17, 1949—

American Institute of Mining and Metallurgical Engineers, Annual Meeting, San Francisco, Calif.

Form Quarry Corporation

EXTENSIVE QUARRIES and limestone mines at Douds, Iowa, flooded in 1947, have been idle since that time. Recently, a meeting of interested parties of the Douds section of Van Buren County elected officers and directors for a new corporation to be known as Douds Stone, Inc. Directors have made application to the secretary of state for the new company's charter.

For 20 or more years limestone production both for aggregate and agricultural limestone has been an important part of this section's economy; and so when all operations were closed last year due to flood conditions, the citizens of the county met to formulate plans for easing the situation. The new company will purchase all properties of the quarry industry located at Douds, including machinery, lands, leases, buildings, tracks and office equipment.

H. E. Millen, Douds Quarries, Inc., Douds, was present at the recent meeting to answer practical questions concerning local limestone mining and quarrying conditions. Elected officers of Douds Stone, Inc., are: W. A. Carson, president, Douds; Robert Bruce, vice-president, Keosauqua; Arthur J. Secor, secretary-treasurer, Keosauqua.

Plant Expansion

PACIFIC COAST AGGREGATES, INC., San Francisco, Calif., reports that its rehabilitation and expansion program undertaken early in 1946 will continue well into 1949, although major portions were completed last year. These include a new producing plant at Kerlinger, Calif., now engaged in providing materials for the Delta-Mendota canal and resultant projects; a new distribution yard, batching plant, warehouse and truck maintenance shop in Sacramento; a new distribution yard, batching and drying plants, warehouse and general repair shop and overhaul building in Oakland; modernization and rehabilitation of batching plants and storage bunkers in San Francisco and Selma and expansion of distribution facilities to include retail outlets at Visalia and Lindsay, Calif. A new plant near Pleasanton and one at Centerville, to replace an old plant at Niles, are in process of completion and scheduled for operation in July.

Acquires Gypsum Deposit in Canada

COLUMBIA GYPSUM PRODUCTS, INC., Spokane, Wash., has acquired a newly-discovered gypsum property near Lake Windemere in northeastern British Columbia, with plans to begin working on it immediately. The property is reported to contain at least 40 million tons of high grade gypsum.

A \$670,000 gypsum processing plant is being completed in Spokane, and the first processing of the product

will be for sale as a soil conditioner. Later, machinery will be installed for manufacture of plaster and fabrication of wall board. Officials report that \$83,000 will be spent on the new property in Canada.

N.A.L.A. Directors Plan Meeting

AT THE RECENT executive committee meeting of the National Agricultural Limestone Association, Inc., Washington, D. C., it was decided to hold the mid-Summer Directors' meeting in Chicago on July 16, the first day of the American Road Builders Show. It was assumed that many members would be interested in attending the Road Show which will be held at Soldiers Field, July 16-24.

The executive committee also has extended an invitation to all members of the Association to attend an informal gathering at the Hotel Bismarck on the afternoon of July 16. A cocktail party and dinner followed by a short program will be held in the evening.

Cement Plant Scheduled To Open in October

CAROLINA GIANT CEMENT Co. announced recently through President John Philbrick, that the company's \$1,566,000 plant near Harleyville, S. C., is expected to begin operation in October of this year. The new mill will make portland cement, using the same raw materials as the alumina plant built on the site during the war. It is estimated that there is enough clay and marl on the 180-acre site to maintain the plant for 75 years.

N.R.M.C.A. Yearbook

NATIONAL READY MIXED CONCRETE ASSOCIATION, Washington, D. C., has published its second annual Year Book which is available to all non-member producers of record, as well as members. Contents include a list of Association officers and members of the Board of Directors; a list of active and associate members, with addresses; and a brief account of the work of the Association since it was organized more than 18 years ago.

Foundry Association Meets

AMERICAN FOUNDRYMEN'S ASSOCIATION will hold its 52nd annual convention May 3 through 7, 1948, at Philadelphia, Penn. It is expected that more than 18,000 people will attend. The technical program will contain more than 60 sessions.

Move Main Office

STANDARD SAND Co. has moved its main office to the foundry sand plant which lies approximately two miles south of Grand Haven, Mich. Correspondence should be directed to: Standard Sand Co., Post Office Box 290, Grand Haven, Mich.

Million Dollar Plant Expansion Program

LEHIGH PORTLAND CEMENT Co., Allentown, Penn., has announced plans for a \$1,000,000 expansion of plant facilities at Metaline Falls, Wash. Present capacity of 2000 bbls. per day will be doubled with the addition of a new rotary kiln, new crushing equipment and new equipment at the quarry. Storage capacity also will be increased and coal consumption will be doubled to four carloads daily.

Gypsum Company Plans West Coast Plant

NATIONAL GYPSUM Co., Buffalo, N. Y., has announced plans for a West Coast factory in keeping with its multi-million-dollar expansion program. Company engineers have discovered the existence of a large high grade gypsum deposit in Imperial County, Calif., claims have been filed, and title is expected to be received from the government shortly. The plant to be built already is in the design stage, and will produce gypsum board, lath, plaster and other gypsum products.

Start Gravel Plant

OPERATION OF the J. B. & R. E. Walker, Inc., gravel plant near Salt Lake City, Utah, was scheduled to start early in May. Work is also nearing completion on the company's ready mixed concrete plant at the same location. This combined plant is reported to be the largest installation in the state of Utah.

Gypsum Plant Expansion

UNITED STATES GYPSUM Co., Chicago, Ill., recently completed a major enlargement of its plant at Plaster City, Calif., in the Imperial Valley. This included construction of a building approximately one-half mile long on the 30-acre site, plus numerous other structures up to a 350- x 200-ft. warehouse. In addition 26 miles of railway were constructed between plant and quarries.

Gypsum Production for 1947

DOMESTIC PRODUCTION, imports and apparent supply of crude gypsum reached an all-time high in 1947. Domestic production, up 10 per cent; imports, up 48 per cent; and supply 18 per cent over 1946. Output of calcining plants attained a record total of 5,019,285 tons, or 20 per cent greater production than in 1946. Uncalcined uses consumed 1,892,196 tons. Building plasters and prefabricated products made the greatest gains. Production of prepared finishes, lath, tile, Keene's cement, and sheathing increased 56, 49, 42, 40, and 38 per cent, respectively.

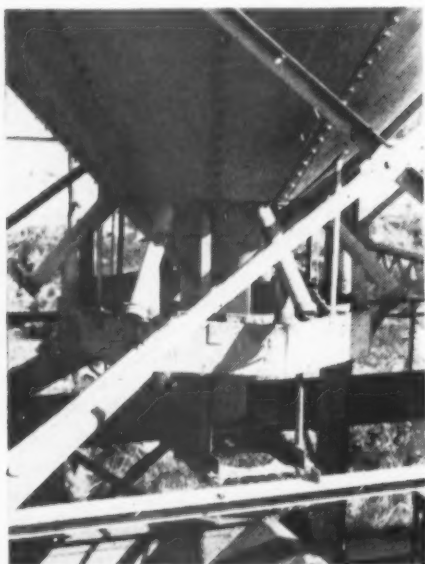
	1946	1947
Crude Gypsum	Short Tons	Short Tons
Mined	5,614,568	6,197,769
Imported	1,457,140	2,157,050
Above figures taken from U. S. Bureau of Mines quarterly gypsum report No. 72.		

HINTS *and* HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Loading Phosphate Concentrates

PHOSPHATE flotation concentrates behave in a slightly different manner than most concentrates, particularly



Assembly used to load phosphate flotation concentrates to open top gondolas

in that they break down from their entrained froth rather easily, and once put in a settling tank, settle rapidly. Thus, a common pattern has been adopted for handling these concentrates.

They are pumped to steel tanks in the sides of which are four vertical screens, usually about 30-mesh. The screens are approximately a foot wide and extend the height of the tank, one located in each quadrant of the tank. As the solids are pumped to this tank and settle quickly, most of the excess water drains off through the screen areas, and when the tank is full it is

drained to open top gondolas by the assembly pictured.

The material is of such a character that even though damp it flows readily into the cars. However, poke-holes are provided at the base of the coned tank, and these can in part drain to the circular launder that in turn discharges to the car below.

Hydraulic Gun

IN THE PHOSPHATE FIELDS of Florida, some of the largest thickeners in the world are in use, a few of which are 375-ft. in diameter. No tank is used to hold these huge traction type thickeners, instead a hole is excavated in the ground. The central sections are supported on concrete foundations, often poured on top of piling.

The problem of repairs, and inspection of arms and plows, was solved at one operation by the use of a hydraulic



Hydraulic gun, mounted on rim of pit holding thickener assembly, used to sluice away solids

lie "gun" mounted on the rim of the pit holding the thickener assembly. By means of the high velocity and large volume of water from the "gun," the settled solids around the center and arm mechanism could be sluiced away.



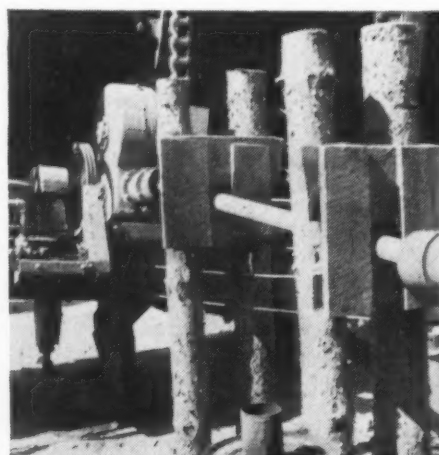
Giant thickener used in phosphate fields of Florida supported on concrete pier in hole excavated in the ground

Illustrations show the hydraulic gun mounted at the rim, and the operating mechanism of the thickener. Concrete piers in the foreground are part of the tunnel for holding under-flow lines when the thickener is in use.

Universal Joints and Shafts

PORTABLE sand and gravel crushing and screening plants have several features that could find more general application by producers. The use of universal joints and shafts is a case in point.

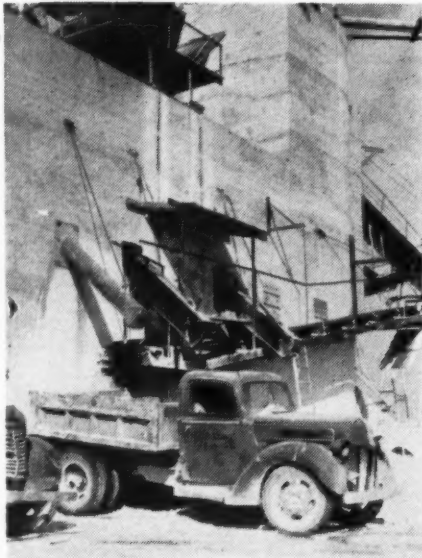
In one of the illustrations may be seen how an inclined belt conveyor was driven by a long shaft and universal joint. The shaft parallels the conveyor up to the head pulley assembly. Another view shows a dryer drive assembly using a universal joint and shaft. A third application is of a line shaft driving part of a portable crushing plant.



Left: Drive shaft and universal joint paralleling conveyor up to head pulley assembly. Center: Drive shaft and universal joint on dryer. Right: Drive shaft connecting Diesel unit to part of crushing plant

Load Direct from Bins

NEWEST of two Maule Industries crushed stone operations serving the Miami, Fla., area, the Red Road plant



Aggregate bins load direct to trucks, or to belt conveyor for car loading

has been built with a central structure of concrete which is approximately 70-ft. high. Screening and final reduction equipment consists of Tyler-Niagara vibrating screens and two Cedarapids hammer mills mounted on the top floors. Coarser aggregates fall to bins below with the pea size being delivered via a short belt conveyor to a separate hexagonal bin alongside the main structure, from which the aggregates can be loaded direct to trucks.

Turntable Mounted Drill

A. E. MARKGRAF, one of two partners in Pontiac Stone Co., Pontiac, Ill., designed this turntable device for mounting a pneumatic wagon drill

used at the company's two quarries for primary blast-hole drilling. Use of this rig, adapted to the terrain and type of stone found at these quarries, greatly speeds drilling as four holes, each 5-ft. apart and on the perimeter of a 7-ft. diameter circle, can be drilled from one rig set-up. Mounted on a 3-ton truck chassis, the turntable carrying the drill is capable of being swung in an arc of 270 degrees. One man can easily swing the turntable from one side of the truck to the other.

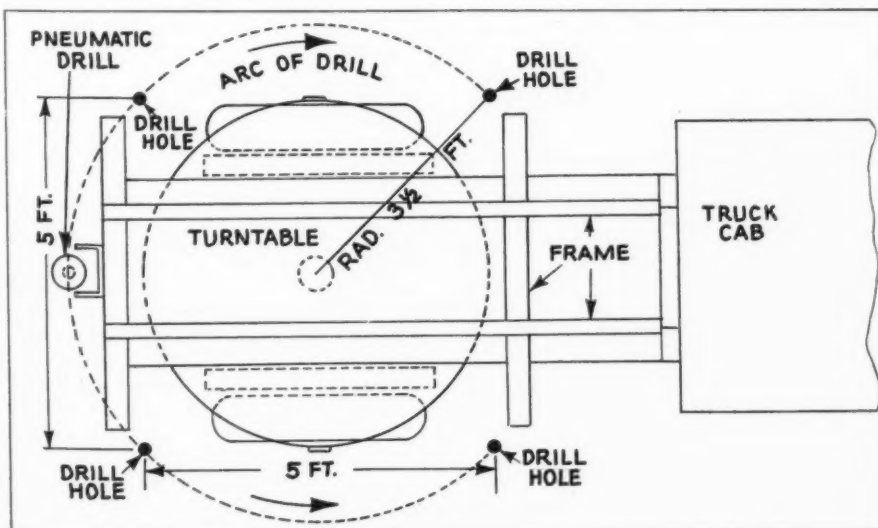
Concrete "A" Structure

NORTH CAROLINA PRODUCTS Co. has opened a new block and pipe plant at Raleigh, N. C., where aggregates are delivered by rail and dumped from a standard gage railroad trestle that straddles the tunnel reclaiming belt system. Support of the trestle is by reinforced concrete "A" frames or



Concrete bent structure is used to support railroad trestle over tunnel reclaiming belt system

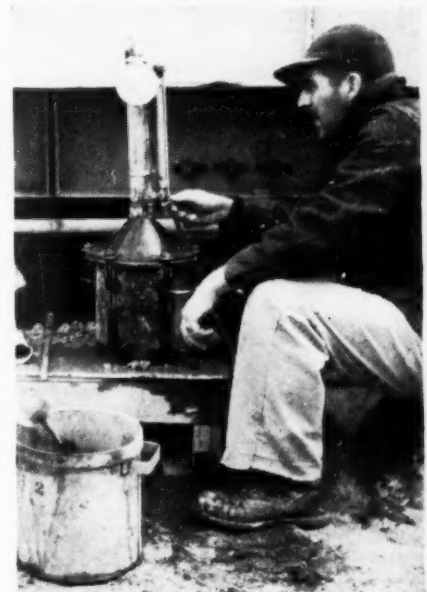
bents of massive design, about 24-in. sq. The steel "I" beams are 20-in. units. The entire structure gives an impression of solidity and strength.



Showing plan for drilling four blast-holes from one rig set-up. Each hole is 5-ft. apart on the perimeter of a 7-ft. diameter circle

Determining Air-Entrainment

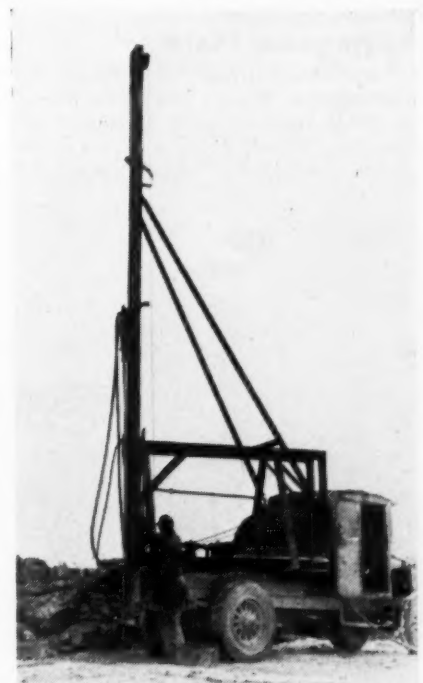
PORTLAND CEMENT ASSOCIATION will hold a daily demonstration of the pressure method of determining air



Recently developed pressure-type entrained air indicator to be on exhibit at the P.C.A. booth

content of freshly mixed air-entrained concrete in its booth at the 45th annual road show in Chicago, July 16 to 24. The entrained air indicator which will be used enables accurate determinations to be made under field conditions in 7 to 8 min.

Added features of the association exhibit will be a color, sound movie of modern expressways under construction and in service; and photographs of important highways and airports.



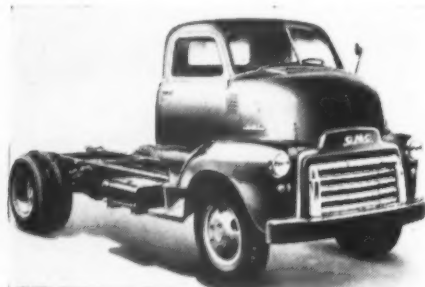
Wagon drill on turntable mounted on truck



MACHINERY

Announce New Models

GENERAL MOTORS CORP., Truck and Coach Division, Detroit, Mich., recently announced two new cab-over-engine



A typical model of 11 new cab-over-engine trucks offered by manufacturer

engine truck series, totaling 11 basic models. These new trucks are classed as FF-350 and FF-450 series, with all models ranging in wheelbase from 122- to 197-in. Gross combination weight ratings range from 26,000- to 37,000-lbs., with a special heavy-duty rear axle on the FF-450 series. The manufacturer states that in addition to a stronger chassis and more powerful motor than in similar pre-war models, the new series incorporates many refinements in the cab, including many new safety features plus added driver comforts.

Semi-Portable Aggregates Plant

PIONEER ENGINEERING WORKS, INC., Minneapolis, Minn., has brought out its 145R semi-portable crushing and screening plant. It is a duplex unit with a 1524 jaw crusher and a 18- x



Semi-portable crushing and screening plant mounted on structural steel chassis, rated at 40 to 50 t.p.h. capacity of three sizes of material

30-in. roll crusher, together with folding bucket elevator and power unit, all mounted on a structural steel chassis with steel wheels. Pneumatic tires are optional.

Other equipment includes a triple-deck, 3- x 10-ft. vibrating screen mounted above a 20-cu. yd., three-compartment steel storage bin, and a return conveyor from the screen to the roll crusher. For moving, the bucket elevator is folded over the crusher units and the screen, bin and return elevator are loaded on trucks.

The plant is rated at a normal capacity of 40 to 50 t.p.h. of three sizes of material. The hopper-fed primary crusher will take rock up to 12-in.

Special Shovel Dipper

MARION POWER SHOVEL CO., Marion, Ohio, has announced that the new 33-M, $\frac{3}{4}$ -cu. yd. shovel will use as



Showing new $\frac{3}{4}$ -cu. yd. shovel; with inset of special dipper

standard equipment a dipper manufactured by Pettibone Mulliken Corp., Chicago, Ill.

Motor Control Center

GENERAL ELECTRIC CO., Schenectady, N. Y., has developed a new motor control center which makes possible control of any number of motors rated



Compact motor control center, showing method of sliding starter in to completed panel

up to 200 hp. at 440 volts from one central location. Control centers are designed so that all connections can be made from the front, thus permitting the centers to be lined up against the wall or in back-to-back position to conserve space. Sections are 90- x 20- x 12-in. deep, and are furnished with starters in five different sizes. Power connections to starters are made by "clothes pin" contacts which grasp vertical busses in the rear of the sections when the starters are slid into place.

Downhand Welding Electrode

HOBART BROTHERS CO., Troy, Ohio, has developed a shielded arc welding electrode that is particularly designed for welding low alloy high tensile steels in downhand positions. Its chief use is for deep grooves, positioned and horizontal welds. Due to its forceful spray-type arc it is easy to handle, and incorporates low spatter loss, according to the manufacturer. Physical properties: tensile strength, 70 to 80 thousand p.s.i.; yield point, 65 to 70 thousand p.s.i.; elongation, 25 to 30 per cent. These electrodes are available in 3/16- and 1/4-in. diameters only, in 18-in. lengths. Usable with either d.c. or a.c. current.

Pinch Valve Controls Abrasive Material Flow

FARRIS ENGINEERING CORPORATION, Palisades Park, N. J., has announced a pinch valve for controlling the flow of many highly abrasive materials. Known as the Farris pinch valve, the device allows full pipe capacity with equal pressure drop, according to the manufacturer. The valve eliminates water hammer and absorbs vibration, thus preserving other equipment on the line.

The construction of the pinch valve allows for its opening and closing, rapidly, or at long intervals, without fear of structural failure. It comprises basically a rubber tube having a dimension of approximately 1/4-in. thickness. Specially impregnated cloth is wrapped around this tube followed by layers of pure gum. The entire unit is wrapped in acid resistant covering and the flanges are built on during the construction of the wrapping. The entire unit is then vulcanized and cured in ovens blending the wrappers and the inner layers into one flexible and moving wall. Flange faces are of the same rubber as the tube itself. The mechanism is located in mid-position of the valve body by a bracket which also keeps mechanism in an upright and a 90 deg. position from the valve body. These new valves are available



Pinch valve for handling flow of abrasive materials

in sizes from 1-in. to 10-in. for working pressures up to 100 lbs. Other sizes are available from 12 in. to 96 in.

Hot Materials Belt

HEWITT-ROBINS, INC., Hewitt Rubber Division, Buffalo, N. Y., has developed a hot materials conveyor belt that is cushioned with rubber and strengthened with glass. A glass-fiber rubber hose that resists any kind of acid and is said to give much longer service than standard cotton yarn reinforced hose also has been announced by J. H. Hayden, vice-president in charge of sales for the company.

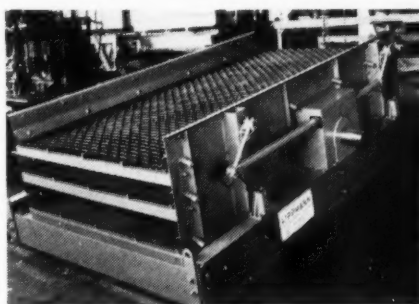
It is claimed that this is the first

time glass reinforcement has been used in the manufacture of conveyor belting or hose. Fiberglass fabric is used in producing the belting, while Fiberglass yarn is the reinforcing material in the hose. This development was started back in 1939.

In the use of the hot materials conveyor belting, it has been found that it will not char or lose strength from heat under 350 deg. F., nor will it lose strength at the fasteners by heat burning out around bolts. It is said that it will not stretch for there is very little elongation in fiberglass fabric. This belt has been used in connection with the foundry shakeout carrying foundry sand at a temperature of 400 deg. F.

Eccentric Type Screen

LIPPMANN ENGINEERING WORKS, Milwaukee, Wis., has brought out an eccentric type vibrating screen, known



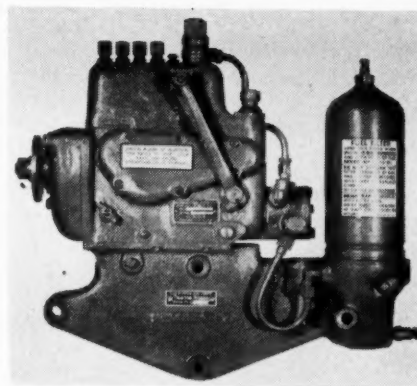
Eccentric type vibrating screen

as Screen-All. Instead of using an eccentric shaft, patented eccentric hubs are mounted on a straight shaft so that the hubs can be accurately counterweighted without offset stresses.

A positive vibration equalizer transmits equal vibration to every square inch of all decks, states the manufacturer. This absence of unbalanced forces during the complete operating cycle eliminates transmission of any vibration to the supporting structure without the use of side or end springs or guy cables. The circular motion permits higher capacities and sharper sizing action, and the greater component of force perpendicular to the decks achieves maximum bed stratification and less blinding, it is claimed. Both screen bearings are mounted outside the screen body, only 7/8-in. apart. The outside mounting also permits locating shaft close enough below the deck to save up to 6 in. headroom.

Diesel Fuel Pump

INTERNATIONAL HARVESTER CO., Industrial Power Division, has announced a field replacement package unit containing a new single-plunger Diesel fuel injection pump for replacing the older four-plunger pumps found on series "35" and series "40" Diesel engines. High-pressure fuel



Single-plunger fuel injection pump

lines and all necessary accessories are included. The single-plunger pump has faster governor action and more accurate fuel metering and injection.

Motor Starter

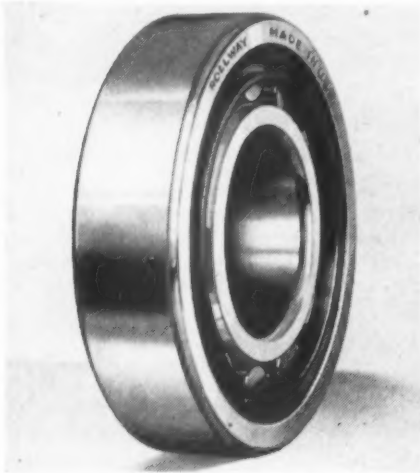
THE ELECTRIC CONTROLLER & MFG. Co., Cleveland, Ohio, has developed the Valimotor starter for 2300-4600 volt motors to protect high voltage motor circuits against damage, regardless of the available kv.a. The bus may have infinite capacity, and the starter and motor may be connected out on the end of the line or right onto the generator bus. The starters are built to provide across-the-line starting; also in the reduced voltage starting style. The 2300-volt top ratings are 600-hp. for 60-cycle systems and 300-hp. for 25-cycle systems. On 4150- and 4600-volt systems, top rating is 600-hp. for 60-cycle service and 250-hp. for 25-cycle operation. The starters limit the maximum fault current that can be obtained on any system to approximately 25,000 kv.a., which is easily interrupted by the type ZHS magnetic contactor used in these starters, according to the manufacturers.



Starter for 2300-4600-volt motors

Roller Bearing with Steel Retainer

THE ROLLWAY BEARING CO., INC., Syracuse, N. Y., has developed a precision cylindrical roller bearing with a steel retainer. Known as Tru-Rol, the bearing has a one-piece steel retainer with pockets having deep, broad, double flanges, or guide lips in



Roller bearing with steel retainer and inner race assembled

which the rollers are kept in alignment, which is said to insure long life by correct guiding of the rollers.

Other bearing components are the outer race with deep, accurate ring grooves in the inside diameter into which fit the heavy, substantial snap rings that retain the roller retainer and rollers in the outer race which make up the roller assembly. The inner race is separate and is interchangeable.

This bearing is being manufactured in a range of sizes conforming with S.A.E. standards for roller bearings. The BE-1200 and BE-1300 series correspond to the single row type of the 200 and 300 size, respectively. The BE-5200 series corresponds to the wide type. Any of these new bearings can be applied using the inner race, or without the inner race, depending on the application required.

Portable Quarry Plant

PIONEER ENGINEERING WORKS, INC., Minneapolis, Minn., has improved its line of two-unit portable plants. As two separate chassis on pneumatic tires are used, larger crushers and screens can be built into each unit without increasing the unit weight. Primary feeding and crushing is done on the first unit, leaving the second for secondary crushing and screening. Another feature is the split feed arrangement to the screens of the secondary plant which provides two complete screening surfaces for specification material, doubling the screening area.

The jaw crusher in the primary unit may be a 1536, 2036 or 2436, and

the roll crusher in the secondary unit may be a 40 x 22 or 54 x 24, with the screen a 4- x 10-ft., or a 4- x 12-ft., on each product deck.

A gravel primary also is available with either a 1036 or 1536 jaw crusher and a 4- x 6-ft., 1½-deck screen. For gravel installations added sand rejection is provided by the screen in the primary.

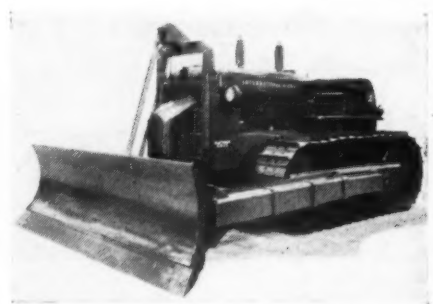
Nylon Filter Cloth

FILTER MEDIA CORPORATION, Hamden, Conn., has developed a nylon-filter cloth which is said to be inert to most common alkalis and organic acids, halogenated hydrocarbons, alcohols, benzene, carbon tetrachloride, etc. This filter media is said to have exceptionally high abrasion resistance, heat resistance, and is unaffected by fungi and micro-organisms. It has a smooth surface which facilitates cake discharge. The filter cloth is produced in twill, chain and plain weaves in numerous porosities and in widths from 26 in. to 72-in. It can be supplied in the form of made-up filter element covers with all sewing done with nylon thread.

Tractor Equipment

BUCYRUS-ERIE Co., South Milwaukee, Wis., is now in production on a complete line of cable-controlled tractor equipment, including bullgrader, bulldozer, scraper, and ripper, for the International TD-24 crawler tractor.

Full visibility is one of the features of the bulldozer and bullgrader stressed by the manufacturer. Compact radiator guard and sheave sup-



Bullgrader on tractor is designed to give operator full visibility

port are set close to the sides of the tractor and the upper bar close to the engine hood enabling the operator to see everything that the blade is doing.

The scraper, called the B-250, has a struck capacity of 22 cu. yd., low center of gravity, and a differential bowl and apron reeving that keeps rope full while giving maximum power at the start of the rolling ejection dump. The scraper's apron can easily be converted from the conventional solid type to a hinged type for fast ejection of sticky materials.

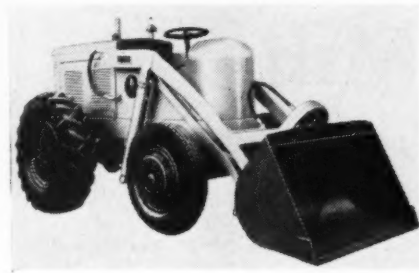
Power for the TD-24 tractor equipment is controlled by either a front-mounted or rear-mounted power control winch. The front-mounted winch is a single drum unit for bull grader or bulldozer control. The rear-mounted winch is double drum and can be used with bullgrader, bulldozer, scraper, ripper, or other attachments. Both winches have planetary drive which eliminates the need for frequent adjustments.



Primary and secondary units of quarry plant

Tractor Shovel

THE FRANK G. HOUGH CO., Libertyville, Ill., has improved its Model HF $\frac{3}{4}$ -cu. yd. Payloader tractor shovel.



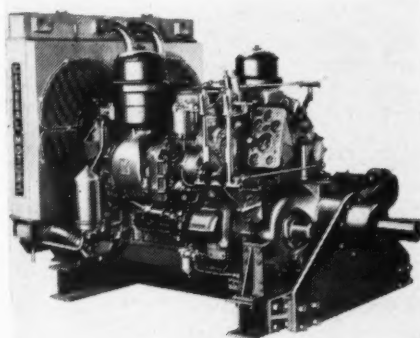
Tractor-shovel with hydraulic bucket control

Previously equipped with hydraulic lift and lowering of the bucket, the machine now has a hydraulic bucket control that dumps and closes the bucket by finger-tip actuated hydraulic cylinder. This feature is said to increase the speed and ease of operation because the bucket need not be dropped to ground and the tractor reversed to close it. It also relieves the machine and the trucks being loaded of dumping shock and wear and tear.

Twin Diesel Engine

GENERAL MOTORS CORPORATION, Detroit Diesel Engine Division, has announced a Twin 4 Diesel engine to complete its line of power plants. This multiple engine unit, Model 8-103, consists of two GM series 71, 4-cylinder Diesels mounted side by side on a common base and geared to a single output shaft. The 170 continuous BHP developed by this unit fills an important gap between single 6-cylinder and Twin 6 models.

Four different power take-off arrangements may be selected. (1) The H.D. or heavy duty power take-off has been designed to take pulley or chain drive side thrust without the need of special cradle-mounted sheave or sprocket. (2) The S.S. or stub shaft can accommodate any of the various types of couplings encountered with heavy duty industrial machinery. (3) The O.H. or S.A. "O" size housing will support any close coupled power take



Twin-Diesel unit develops 170 continuous BHP

off within the proper horsepower range, and is particularly suitable for applications with torque converters. (4) The D.F. or drive-flange is available for installations where the driven machinery is to be coupled directly to the power unit.

Combine Lubricator-Filter

JARETT COMPRESSOR & EQUIPMENT, INC., Newark, N. J., has announced its Lubri-Filter, combining a lubricator and filter. Air is cleaned automatically by a permanent type, cleanable filter element which, it is claimed, never requires replacement. Atomized oil is automatically injected into the air line in proper amounts. The oil level can be seen from any angle. Model 605 of aluminum and brass provides an unrestricted air flow of $\frac{1}{4}$ -in. I.P.T.

Self-Aligning Idler

CONTINENTAL GIN Co., Industrial Division, Birmingham, Ala., has designed a patented self-aligning belt conveyor idler. It has been made in designs suitable for troughed, flat and return belt, and the units are said to be interchangeable with practically all standard idlers now on the market.

Construction features include heavy-duty Timken bearings on the $1\frac{1}{2}$ -in. swivel shaft; all grease pipes extend to one side for ease and safety of lubrication; hydraulic fittings are standard equipment. The manufacturer points out that it is not necessary to cut into the deck plate to mount the troughing idlers, making it easy to arrange for replacements on existing installations.

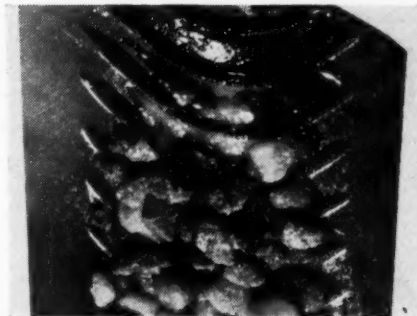
Super-Size Impact Breaker

NEW HOLLAND MANUFACTURING CO., Mountville, Penn., is building an experimental model of a super-size double-impeller impact breaker which will be known as Model 5050. It is modeled after the Model 3030, employing the same principle of impact applied in suspension to reduce stone. Any stone fitting in a 2-cu. yd. shovel will be handled in the Model 5050, according to the manufacturer. It is designed to produce aggregate in two sizes, minus 8 in. and minus $3\frac{1}{2}$ in.

Ribbed Conveyor Belt

GOODYEAR TIRE & RUBBER CO., Akron, Ohio, has announced a ribbed-top conveyor belt designed to prevent backslip in carrying sand and gravel, wet-mixed concrete and other materials up steep inclines. This belt has chevron-shaped ribs $\frac{1}{4}$ -in. higher than the belt surface. The ribs serve as barriers, trapping the water and preventing the backwash of materials down the belt on incline operations, according to W. P. Hallstein, assistant manager of the company's belting department.

It is claimed that the ribbed belt eliminates any noticeable backslipping



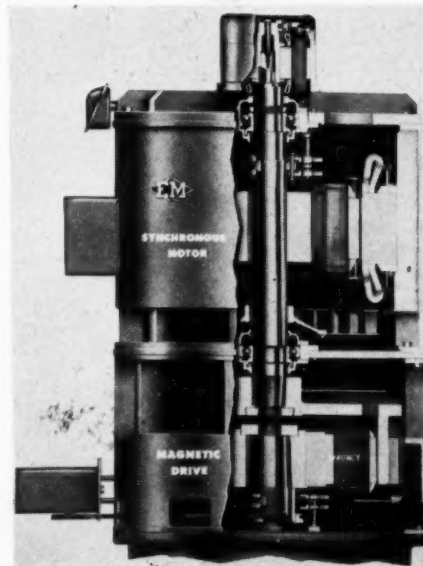
Conveyor belt with curved ribs to move wet materials up steep inclines

of most wet materials on inclines up to a 20-deg. angle. Development of the belt resulted after observation of a smooth-type inclined belt where wet-mixed concrete avalanched 20 ft. per minute whenever the belt stopped. It is said that the ribbed cleats also increase belt life substantially by reducing the severe wear a backslipping load inflicts on a conventional belt in motion. The curved ribs are closely spaced to overlap each other and assure a smooth return run of the belt over idlers.

The new belt has a five-ply rubberized fabric body, and a $\frac{1}{4}$ -in. top cover in addition to the ribs. It is being made in widths of 30- to 48-in., and in lengths to users' specifications.

Drive for Pumps

ELECTRIC MACHINERY MANUFACTURING CO., Minneapolis, Minn., has made available a vertical synchronous motor magnetic drive unit which provides adjustable speed control for centrifugal pumps. The motor drives the ring of the magnetic drive at constant speed. The magnet member of the magnetic drive mounted on the gear shaft operates the pump at the speed required by the liquid level control.



Vertical synchronous motor magnetic drive unit rated at 250 hp., 1200 r.p.m.

FIRING SEVERAL ROTARY KILNS With One Coal Mill

A CIRCULATING SYSTEM of distribution whereby more than one kiln may be fired from a single direct-firing coal mill was adopted by Universal Atlas Cement Co. at Independence, Kan., as the solution to a threatened shutdown of the plant for lack of natural gas. There had been recurring periods of inadequate supply of gas during periods of peak demands for domestic consumption, but the possibility of complete shut-off this past Winter made it advisable to have a dependable, alternate source of fuel that can quickly be pressed into service.

Direct-firing individual mills for each of the four 9- x 175-ft. kilns at Independence were unavailable at the time of crisis but a single unit of sufficient capacity to fire two to three kilns simultaneously was obtainable. The circulating system installed is a flexible and permanent arrangement to guard against future uncertainties in the availability of natural gas.

Circulating systems of firing with pulverized coal are not new, being widely used in other industries, but in much smaller capacities than the system at Independence, which is the first application in the portland cement industry of a mill that dries, grinds and injects the pulverized coal into two or

By BROR NORDBERG

Universal Atlas Cement Co. installs single large-capacity, direct-firing coal mill and circulating pipe system to fire two to three kilns simultaneously. This system serves as an alternate source of fuel during recurring periods of inadequate gas supplies during the Winter

more kilns simultaneously. It is the largest system of its kind in any industry and the mill is the largest of the single-race type, an E-70 B & W, ever built by the manufacturer. Successful operation at this plant suggests an economical means of achieving the benefits from direct-firing, particularly in plants with a multi-

plicity of small kilns where individual mills could not be justified because of high costs.

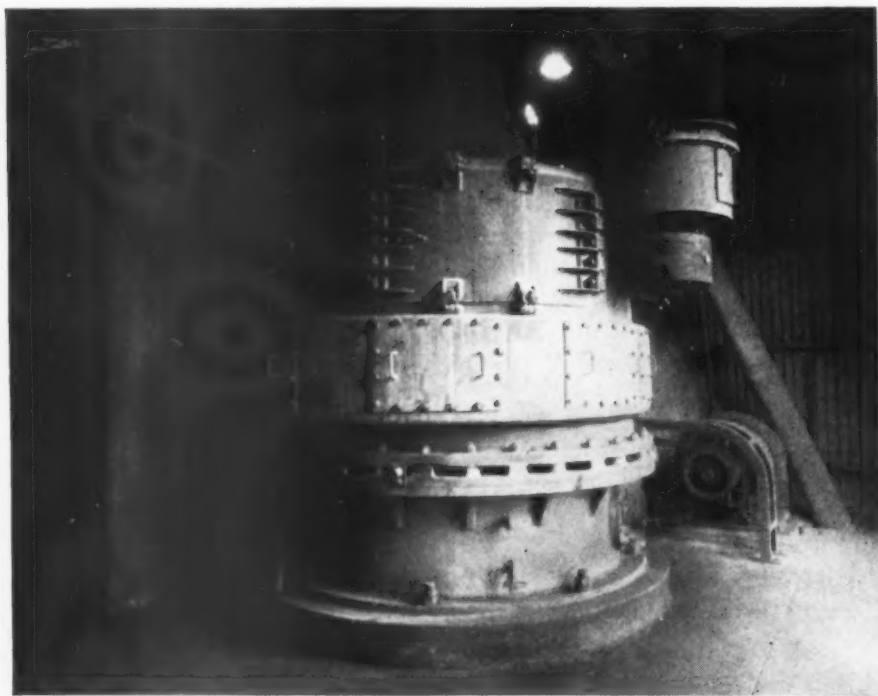
General Arrangement

The plant is dry process with four kilns. Kiln speed is synchronized with rate of feed, and exit gases exhaust through a common flue to waste heat boilers for electric power generation. Coal had been burned previously on these kilns years ago, with the bin system, but drying and pulverizing units had long since been dismantled. Oil also had been burned, and oil has been the stand-by fuel during the past several years of gas curtailment. Natural gas is retained as the standard fuel, with pulverized coal as an alternate.

An extension to the firing end of the kiln building, off to one side from No. 1 kiln, was constructed to house the pulverizer which was installed at ground level in line with grate-type clinker coolers below each kiln. The system consists essentially of a continuous loop of piping, 275-ft. long over-all, extending from the mill to the fan and thence across the firing floor overhead and returning to the fan, through which the pulverized coal-primary air mixture is circulated continuously. The piping reverses on a 7 ft. 6 in. radius at the far end of the building. Valves are manipulated to draw off coal into vertical drop pipes in front of each kiln from the overhead circulating system, for firing any kiln or combination of kilns within the capacity limits of the pulverizer at a given time.

Pulverizer

The pulverizer measures 12 ft. high over-all and 9 ft. 10 in. outside diameter of the windbox. It has a 70-in. pitch circle and a rated capacity of 18,250 lb. per hour in grinding coal at 50 grindability to 80 per cent minus 200-mesh fineness. It is fed coal from an overhead 20 ton surge bin by an automatic two-speed table feeder and has an automatic throw-out for tramp iron. The mill is operated under suction with a 48-in. diameter exhaustor drawing heated air from the kiln hoods through the mill and forcing the primary air-coal mixture through the circulating distribution line under pressure. A single hot air pipe extending over the four kiln hoods, with appropriate dampers, was provided for draw-off of heated air into the pulverizer.



Closeup of single unit coal pulverizer to fire one, two or three kilns

CALCINATION

Drive for the exhauster is a 150-hp. slip-ring motor turning at 1800 r.p.m. with self-aligning pillow-block bearing; that for the mill is a similar motor rated at 1200 r.p.m.

The system was designed to have a capacity for simultaneous firing of two kilns with a peak fuel demand of 15,240 lb. of pulverized coal per hour, allowing plenty of surplus pulverizer capacity for excess circulation through the system, and for starting up periods, excess loads and unusual burning conditions that may be encountered in the kilns. However, with normal kiln output and fuel demands, and with average quality and grindability coal, such as has been used to date, the system can readily meet fuel requirements for three kilns simultaneously. It has fired three, two, and a single kiln, dependent upon the available supply of natural gas. Some consideration has been given to the future possibility of burning a mixture of pulverized coal and natural gas by introducing the gas into the coal burner pipe. In that event, four kilns may be fired with a mixture in which up to 75 per cent of the total fuel might be pulverized coal.

There are considerable variations in the quality of Kansas and Oklahoma bituminous coals available, which have bearing on the relation of pulverizer capacity to kiln requirements. Heat value may vary from 9000 to 12,500 B.t.u. per lb. as received, surface moisture ranges from 3 to 11 per cent and sometimes may be as high as 15 per cent, while ash content fluctuates widely. The best grade available contains 10-15 per cent ash at about 12,500 B.t.u. as received.

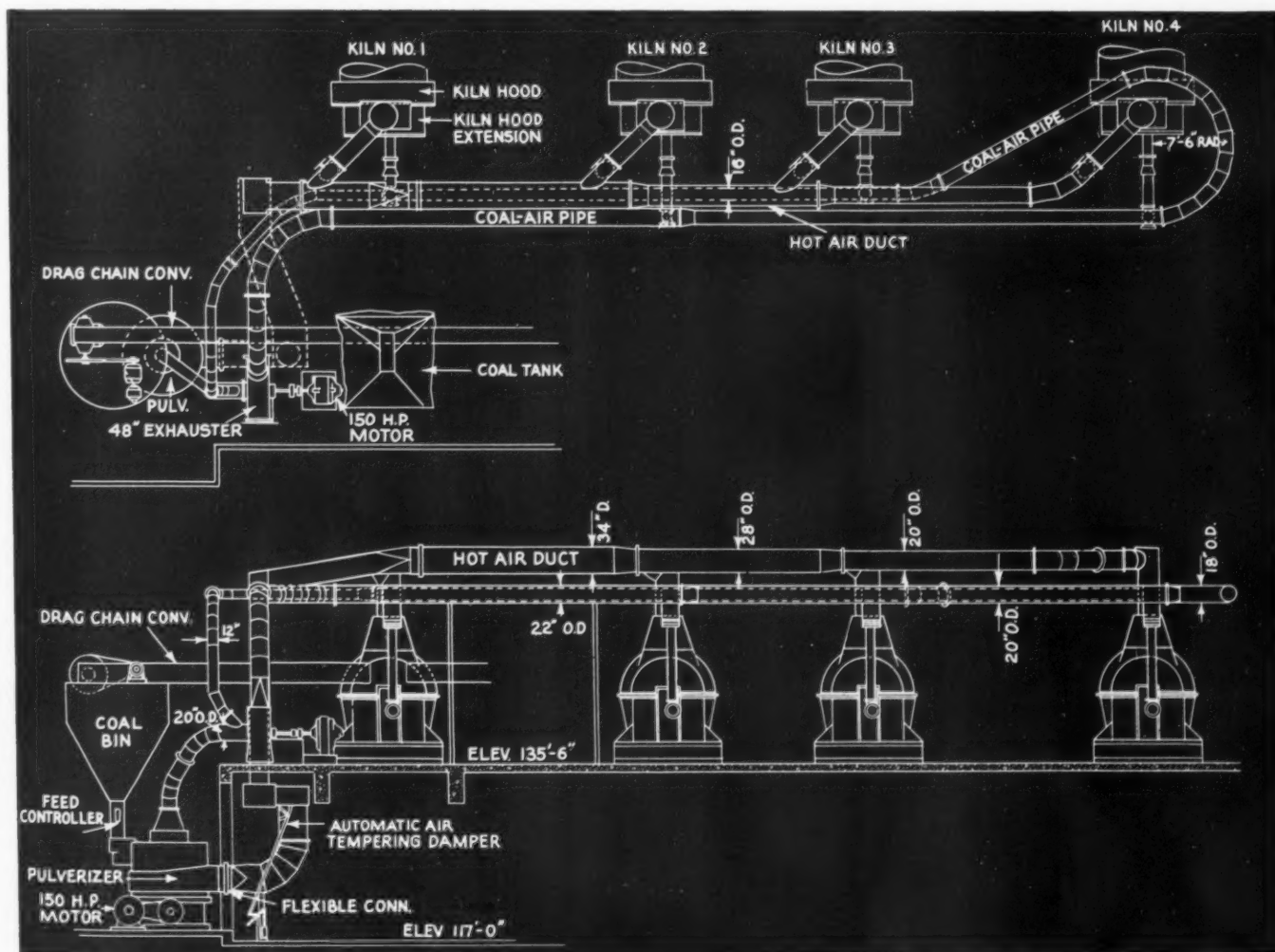
Distribution System

The distributing line must always carry a surplus of primary air-coal mixture in excess of the demands of the burners and the surplus is re-circulated back to the mill exhaust fan, entering the pipe from the mill at a point just ahead of the exhaust fan. The amount withdrawn from the main line by one or more kiln burners is replaced by output from the pulverizer, so that there is created a reservoir of pulverized coal and primary air in desired proportion for direct-firing in the kilns. Amount re-circulated is a variable, dependent upon

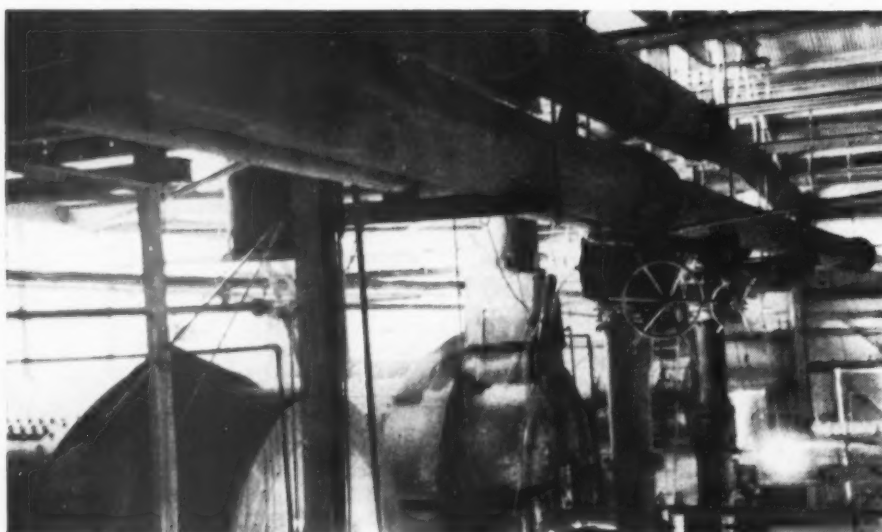
how much fuel and air is being tapped from the line.

Pipe diameters in the circulating line are reduced progressively to compensate for removal at the points of use and are designed to maintain desired pressure in the line and sufficient velocity to prevent deposition of the coal fines inside the pipe. The sequence in which the line is tapped is kiln Nos. two, four, three and one. Pipe diameters are 22 in. from the mill fan to the point of takeoff for kiln No. 2, 20 in. to No. 4 kiln; 18 in. to No. 3 kiln; 16 in. to No. 1 kiln, and a 12-in. return line to the fan. Vertical headers down to the burner pipes are 12 in. diameter and the burner pipes are 10-in. standard water-cooled type.

At each point of takeoff to a vertical header there is a saddle, and below it a 12-in. plug valve and then a 12-in. butterfly valve operated from a chain wheel by the kiln burner to regulate the rate of flow and pressure into each burner pipe. The plug valve is kept wide open when the corresponding kiln is being fired. Velocity through the main line is from 4000-10,000 f.p.m. according to the number and sequence of kilns being operated



Plan and elevation of single direct-firing unit pulverizer and circulating coal-air system for simultaneous firing of more than one kiln



Overhead coal circulating line showing vertical pipe for drawoff of coal to fire two of the kilns. Piping above is for heated air from kiln heads to unit pulverizer

and no difficulty has been experienced with deposition of coal in the line. To deflect the coal-air stream upward and create turbulence, in order to eliminate segregation and obtain the same richness of mix in each burner take-off, 5- x 3½-in. angle irons were inserted in notches in the bottom of the circulating header just ahead of the drawoff points.

The entire circulating system was designed to eliminate the hazards inherent to the transportation and burning of pulverized coal. The pulverizer, fan and fittings such as valves, gates and piping were designed to meet the Underwriters' code, to withstand an explosion pressure of 50 p.s.i. and with a safety factor of four. Piping is of ¾-in. steel plate and connections at mill and fan are Victaulic couplings. Auxiliary compressed air connections at each of the four plug valves permit periodic blowout of the small dead space at the valve connections on kilns not being fired with

coal and, should there be a prolonged idle period of the entire system, it is cleared of combustible mixture by shutting off the coal-feeder and running pulverizer and fan with one or more burners open until the mill and circulating system are empty. If an explosion should occur, the fire is carried right on through the burner pipes which are open, to be dissipated in the kilns.

Operation

In a system such as this, it is essential to have an excess of primary air-pulverized coal mixture circulating, and also to maintain a pressure in the line at the last burner take off. The return line to the exhaustor fan must therefore be restricted so as not to draw away fuel from the last kiln. A 12-in. butterfly valve in the return line at its junction with the pipe from the mill just ahead of the exhaustor fan is set and held at a constant opening, which is changed according to the number of kilns being fired. Total pressure drop across this valve and through the circulating line determines the total static pressure of the fan, which is also equal to fan discharge pressure plus pressure drop across pulverizer.

Fan discharge pressure is in the range of 20 to 28 in., dependent upon the number of kilns being fired. Temperature of the primary air-pulverized coal mix is held automatically at 150 to 180 deg. F. as measured by thermocouple at the fan outlet. An air tempering damper in the intake hot air pipe to the mill is hooked up to the thermocouple.

Approximately 30 per cent excess fuel over the rate of consumption is circulated through the distribution line with three kilns operating, which increases to as high as 50 per cent with one kiln on the line. Temperature drop through the line is insignificant, ranging from 5 deg. F. when one kiln

is being fired up to 10 deg. F. with three kilns on the line. Most of the time thusfar, one or two kilns have been fired with pulverized coal because sufficient natural gas has been available to supply the others, but there has been some experience with three-kiln operation. Fineness of grind varies from 80 or 85 per cent through 200-mesh, down to 97 per cent minus 200 mesh when the mill is carrying a light load in handling the requirements of a single kiln.

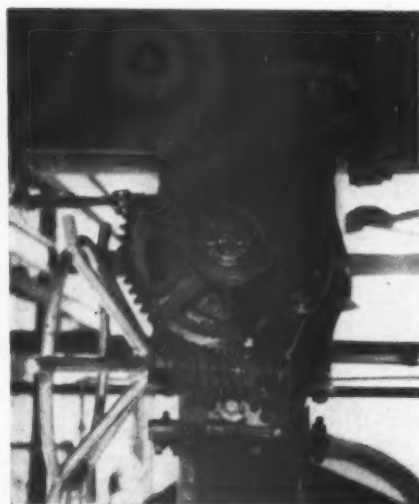
Clinker is burned at 2600-2700 deg. F. by a short, hot flame that compares with a gas flame in its action, due to the lean mix and fine grind, particularly on one-kiln operation. Percentage of primary air, on one kiln operation, exceeds figures that prevail when kilns are fired with coal by other methods and is as high as 50 per cent due to the air required for sweeping the pulverizer at low capacity. The ratio drops to between 25 and 30 per cent for two kiln and three kiln operation. Secondary air for combustion is preheated through the air-quenching clinker coolers and its volume is determined by the draft maintained at the back ends of the kilns. Velocities of injection from the burner pipes into the kilns are high—as much as 13,000 f.p.m. (with one kiln being fired) from the tip of a 10-in. diameter burner pipe.

Operating data thusfar available are limited because experience with the system under all possible conditions has been limited. The mill differential, i.e., drop across the pulverizer, is about 4 in. with one kiln operating; 6 in. for two kilns and 8 in. for three kilns. The fan discharge pressure, according to a test run, is 28 in. when one kiln is fired; 17.4 in. for simultaneous firing of kiln Nos. 1 and 2; and 22.5 in. for kiln Nos. 1 and 3.

Air-weight out of the burner tip when one kiln is fired averages about 450 lb. per minute. For two kilns, the figure is about 575 lb. per minute and, for three kilns, about 690 lb. per minute. These figures are the result of early test runs. Power consumption for the mill motor is about 95 hp., 87 hp. and 80 hp., for three, two and one kiln operation, respectively. The exhaustor motor is operated at near full load when three kilns are operating.

Controls

Automatic controls govern the rate of feed of coal into the pulverizer. Coal is fed into the pulverizer from the overhead surge bin by a two speed feeder which is automatically regulated by a Bailey twin relay pulverizer feeder controller in accordance with air flow changes through the system. The pulverizer is kept under automatic mill level control whereby the control functions to meet the demands of the circulating line when fuel adjustments are made to meet the requirements of the individual kiln.



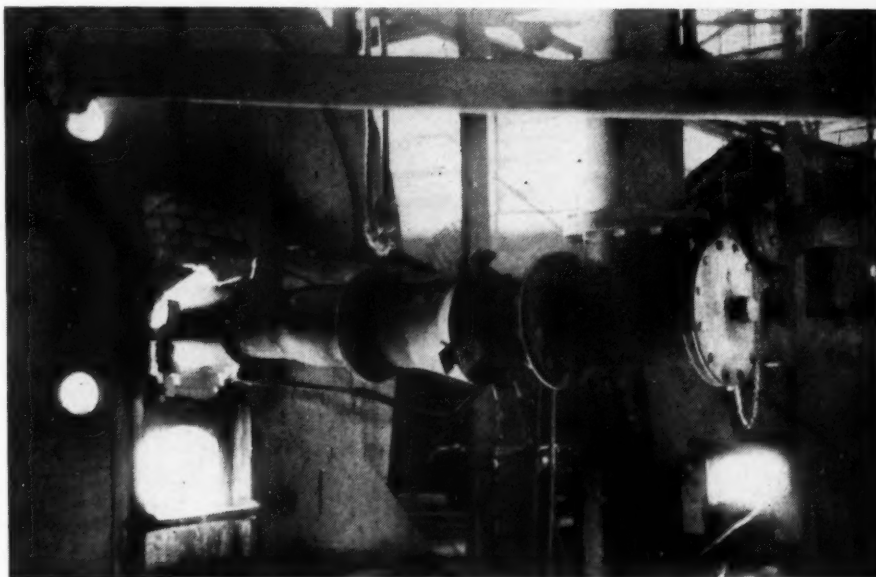
Valve to release circulating coal from distributing line into vertical header to one of kilns

The controller consists of two diaphragm-operated differential measuring units, one to measure the pressure drop across an orifice, or venturi tube, in the primary air duct leading to the pulverizer; the second and smaller one to measure the pressure drop across the grinding element of the pulverizer. The large diaphragm permits accurate measurement of the primary air flow; the other is of such size that the ratio of the diaphragm areas is inversely proportional to the ratio of the differentials across the pulverizer and across the primary air orifice.

The diaphragms are opposed and when out of balance exert a force which makes or breaks electrical contacts whenever a predetermined relation exists between the pulverizer differential and the primary air flow differential. These contacts in turn, through relays in the controller, operate the feeder motor at either high or low speed or stop it to maintain the required rate of coal flow into the mill. Thus, when the feeder is in high speed and the coal feed increases to the maximum, the pulverizer differential increases to cause a contact arm to switch the feeder motor to slow speed, etc. Also, when there is a decrease in the primary air differential below the ratio set, an arm stops the feeder motor; as the pulverizer differential decreases with the sweeping out of the coal, an arm swings to start the motor again.

Through this system of automatic control, the pulverized control discharged into the circulating line is maintained at a nearly constant density under a given load condition and that density is varied to meet the most favorable operating conditions by regulating the coal-air ratio by adjustment of the mill level controller. The only adjustment the burner will usually make is the rate of firing which is indicated by pressure gages on the several burner downcomers. In such event adjustment is made at the controller. With one kiln being fired, pressure in the burner downcomer is 6 to 7 in.; with two it is about 4 in. pressure.

A new coal crushing and handling plant was built in connection with the pulverizer installation. It consists of a belt conveyor from cars to 24- x 18-in. double corrugated crushing rolls which produce a minus $\frac{3}{4}$ -in. product; belt conveyor and elevator; and four overhead 41 ton bins which were once used in connection with coal firing before conversion of the plant to natural gas. Each bin has a slide gate underneath and coal may be drawn from any bin or any combination onto a drag conveyor that fills the pulverizer feed bin. A level indicator in the feed bin actuates the drag conveyor automatically according to level in the bin. All equipment up to the four storage bins is electrically-interlocked and the fan and pulverizer likewise



Burner pipe, showing connection with vertical header from overhead distribution line

are electrically-interlocked. The plant generates 25-cycle electric power, but the new equipment is powered by 60-cycle power obtained from a frequency changer or by purchased electricity.

General-Plant

Kilns are fired with a back end draft of 0.30 in., and back end temperatures from coal-fired kilns is about 1600 deg. F. Far less ring trouble in the front ends of the kilns is being experienced with pulverized coal firing as compared with natural gas, possibly due in part to flame fluctuations.

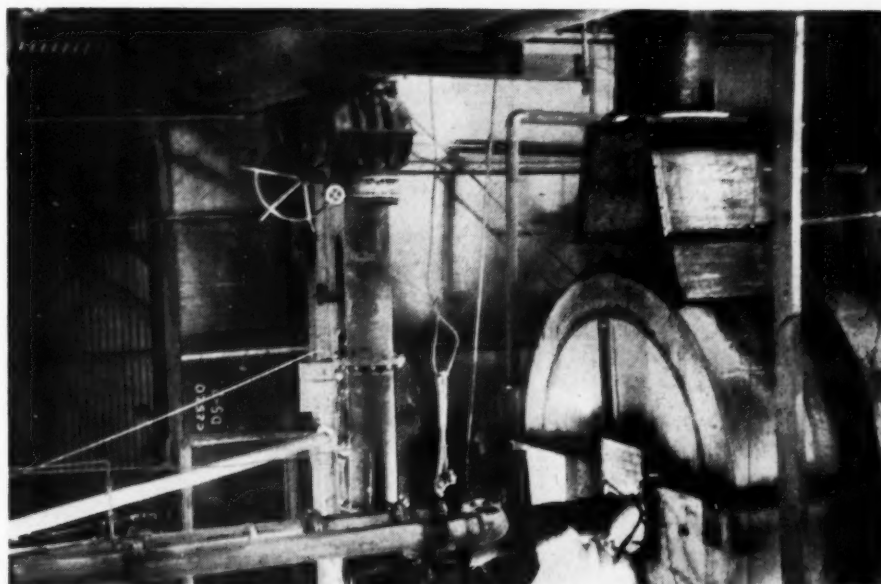
Possible Limestone Tax

HOUSE BILL No. 357, State of Missouri, would require all firms engaged in producing certain materials in the state, including limestone, to periodically

file volume reports of their operations with the State Division of Mine Inspection for the purpose of taxing said production at the rate of two mills per ton. The stated purpose of this tax is to allow increased state supervision of the industries concerned as far as safety and health precaution are concerned. As now written, the law exempts producers of agricultural limestone.

Free Guatemala Cement Imports from Duties

GRAY, white, and industrial cements have been freed from customs duties, allotted revenues tax, consular fees, and the custom-house reconstruction tax in Guatemala, it has been announced. The action was taken due to the shortage of the cement supply in the country.



Firing kiln with natural gas. Note coal piping installed for alternate selection of fuel

LONG BELT CONVEYORS

Reduce Haulage Cost

Wm. May Sand and Gravel Corp., Ft. Wayne, Ind., relocates plant and installs two conveyors to move all material from pit to plant

REALIZING the benefits to be derived from employing workers on a year round basis once they have become familiar with plant operation, William May, president, Wm. May Sand & Gravel Corp., Ft. Wayne, Ind., provides sufficient maintenance and expansion work around the pit for Winter employment. In 1946-47 the plant was relocated on the opposite side of the pit as "Winter work"; and the most recent innovation was the installation of a 155-ft. swing conveyor in the pit.

In relocating the plant, all work was done by the pit crew aided by men and equipment from the Wm. May Construction Corporation. This work was undertaken at a period when the sand and gravel plant was closed down due to the cold, and work for the construction company was slack. A long conveyor and two poured-in-

By DAVID MOCINE

place reinforced concrete storage bins of 125-cu. yd. capacity each, were erected at the new plant location. The construction company is located at the former site of the screening plant.

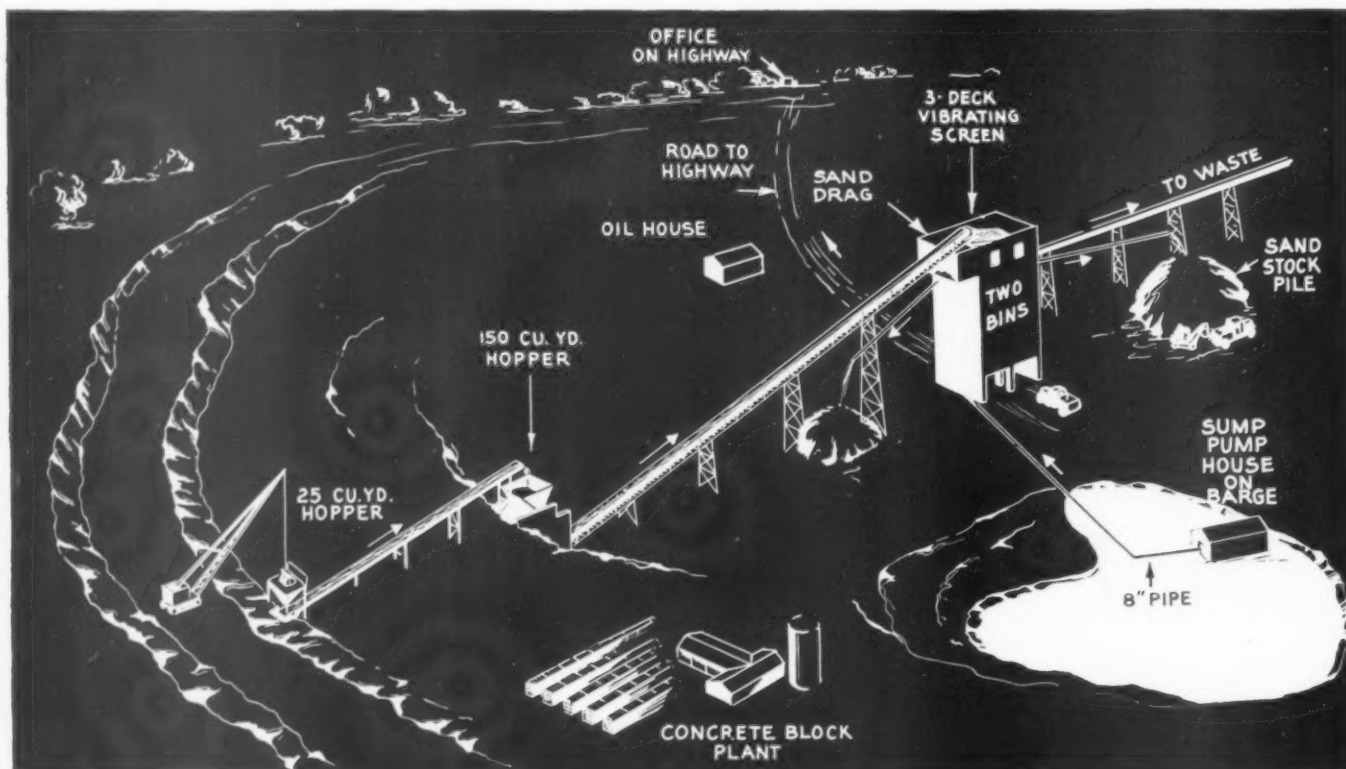
The present deposit consists of an average overburden of 3-ft. which is loaded to trucks and principally sold for fill, with possibly 10 per cent being dumped to waste in an abandoned pit nearby. All stripping and excavating is accomplished with a 1½-cu. yd. Diesel powered dragline. Immediately under the overburden lie 4-ft. of high grade sand and gravel. Next is a 1½-ft. layer of clay which is also trucked to the abandoned pit.

Under the clay, a 15- to 25-ft. strata of useable sand and gravel is encountered; followed by a 6-ft. strata of

sand that contains too many fines for concrete sand and is sold as fill material. A large market has been created for fill material in this area.

Belt Conveyor Replaces Haulage Units

Material to be processed is dumped by the dragline bucket to a hopper of 25-cu. yd. capacity. Material from the hopper is discharged by vibratory feeder to a 24-in. swing conveyor belt, 155 ft. centers, for elevation to a 150-cu. yd. surge hopper. Before the swing conveyor installation was made, this hopper served as a truck hopper for material trucked to the plant from the dragline, and it still retains a heavy grizzly. Surge hopper capacity was doubled to 150-cu. yd. with the installation of the swing conveyor, and will now provide sufficient storage for 1½ hours of plant operation when



Layout of sand and gravel pit with swing conveyor feeding main plant conveyor

the dragline has to be moved or operation stopped for some other reason.

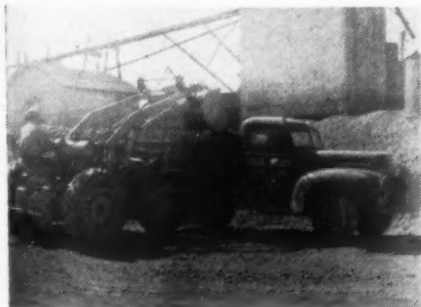
According to Mr. May the new conveyor belt installation provides more material per hour for the plant than was possible with the truck relay system. In addition, the belt is less expensive to operate, replacing three 10-cu. yd. dump trucks for the average dragline-to-plant haul.

Material from the secondary surge hopper moves over a pan feeder to a 24-in. belt conveyor on 220 ft. centers, inclining up 78-ft. to the screening station located on top of the reinforced concrete storage bins. Both the vibrating feeder in the primary hopper, the pan-type feeder under the secondary surge hopper and their respective hoppers are of Mr. May's design and construction.

Material from the discharge end of the main conveyor is chuted to a 4- x 8-ft. triple-deck wash screen, with oversize on the first deck, plus 1 1/4-in. stone, being chuted to one side of the storage bins for stockpiling. This stockpile, which receives all excavated material over 1 1/4-in. mesh size, represents a surprisingly small percentage of the total received in the plant; and contains almost no stone over 2-in. Second and third decks of the screen carry 3/4- to 1/2-in. mesh, respectively. Oversize on the second and third decks (covering a range from minus 1 1/4-in. to plus 1/2-in.) are chuted to one bin as washed gravel. Throughs from the last deck, minus 1/2-in., are chuted to a sand drag, from which material falls to the second bin as mason sand, No. 17.

Pump Water from Sump for Wash Water

In normal operation, oversize from the second and third deck are chuted to a common bin, and in this case the function of the second deck is merely to take some of the load off the bottom screen. Overflow from the sand bin is dropped to a stockpile and gravel from the other bin is trucked to stockpile. In the immediate future, it is planned to install a system for conveyor stockpiling all material over a series of reclaiming tunnels for direct truck loading. All material produced at the plant is delivered to trucks (county and state highway), May Construc-



Front-end type loader



General view of plant, showing swing conveyor and main conveyor, to the left; plant to the right with flume to carry away waste; in foreground is sump pump station

tion Co., and private contractor trucks.

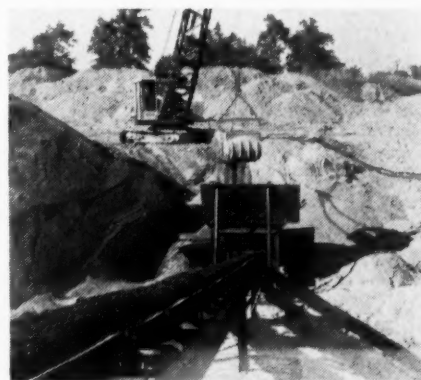
Most of the pit operation is below water table level, but is kept dry by a 10-in. suction, 8-in. discharge pump that operates an average of 8-hours per day on a year round basis. This pump is mounted on a barge which floats on a sump pond, at the low point of the pit. When the plant is in operation, an additional booster pump with a 4-in. outlet elevates part of the flow to the screening station as wash water. Water from the main pump is piped to a nearby river and waste water from the plant is flumed to a settling pond before being discharged to the river. About 20-cu. yd. of fines are recovered from the settling pond daily, which are disposed of in the same manner as the 6-ft. strata of fine sand found in the pit.

Three loaders are used at the plant to load stockpiled material to trucks: one of 3-cu. yd. and two of 2-cu. yd. capacity. The larger loader is crawler tread mounted while the two smaller are mounted on rubber for greater flexibility in moving from one storage pile to another as required.

Approximately 6000-cu. yd. sand, 4000-cu. yd. washed gravel, 2000-cu. yd. road gravel and 10,000-cu. yd. bank gravel are stockpiled in the worked-out area of the pit by the time the weather becomes too cold for plant operation. County road maintenance provides the principal outlet for the last two grades mentioned.

The 1 1/2-cu. yd. Bucyrus-Erie dragline provided at the sand and gravel pit is one of several belonging to the construction company. The swing conveyor has Goodyear belting, and is powered by a 25-hp. General Electric motor. Belting for the main conveyor, also 24-in., is of Cincinnati Rubber Co. manufacture, and the conveyor is powered by a 30-hp. G. E. motor. Deister Machine Co. supplied the 3-deck, 4- x 8-ft. vibrating washing screen, powered by a 15-hp. G. E. motor. A 25-hp. Allis-Chalmers motor drives

the sand drag, and a 60-hp. G. E. motor operates the American Manganese pump. The smaller booster pump is driven by a 15-hp. motor. Loaders consist of a rubber tire mounted Haiss; an Owens front end loader mounted on a Case tractor and Athey



Loading swing hopper over long belt to plant

overhead mounted on a Caterpillar tractor. Harold Hiller is superintendent of the sand and gravel plant.

PACIFIC SAND AND GRAVEL CO., Centralia, Wash., has been awarded a contract for \$3,195 for 1500 cu. yd. of ballast to be placed on a 4-mile stretch of the Centralia-Alpha road.



Overhead type loader

TRIPLE CAPACITY of Stone Plant With New Screens and Crushers



Truck and semi-trailer moving to dumping position over primary crusher. Plant is shown in the background

Bryan Rock and Sand Co., Rolesville, N. C., places primary jaw crusher in quarry, and replaces bucket elevator with conveyor

QUARRY OPERATORS, faced with the problem of meeting increasing demands, have not only added more equipment but also have found it necessary to change the location of existing equipment to squeeze out greater production. Both of these methods have been employed at the Rolesville, N. C., crushed granite plant of the Bryan Rock and Sand Co.

Prior to 1942, stone crushed in a primary jaw crusher in the quarry was elevated by belt conveyor to a grizzly where the oversize was sent to a gyratory crusher for reduction, and the product passing the grizzly was reduced in a cone crusher. The crushed stone from the gyratory was then chuted to the cone for further reduction, and the final product was delivered by bucket elevator to a triple-deck screen for sizing.

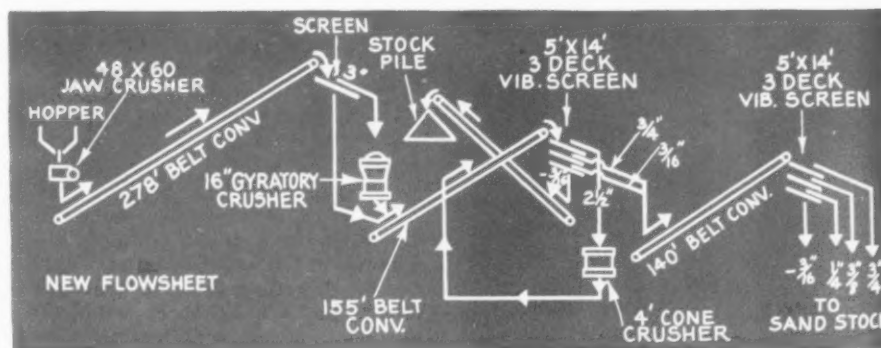
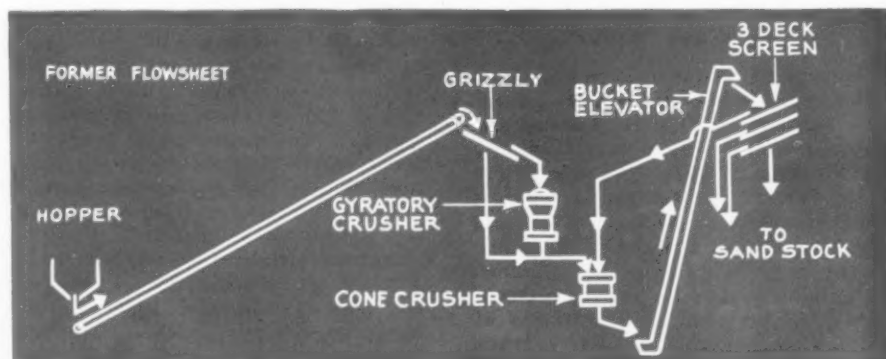
Production was doubled in 1942, when a vibrating screen replaced the grizzly, another screen was added and belt conveyor transportation replaced the bucket elevator. In 1946, still another crusher was added and larger trucks were installed in the quarry to provide a more uniform flow of material to the plant. Production was again increased by speeding up belts and the other changes. From a daily capacity of 1000 tons per day with the old arrangement, production jumped to 2000 tons per day with the changes made in 1942, and with the additions in 1946, the plant now has a capacity of 3500 tons daily.

In the present setup, stone crushed in the quarry by a 48- x 60-in. Traylor jaw crusher is elevated to the main plant by a 42-in. belt conveyor, 278 ft. centers. The product is scalped over a 5- x 8-ft. Tyrock screen with 3-in. sq. openings, the plus 3-in. stone going by split discharge to a 16-in. Allis-Chalmers gyratory crusher and a 16-in.

Telsmith crusher. Minus 3-in. stone which joins the crusher throughs on a 36-in. belt conveyor is elevated to a 5- x 14-ft. triple-deck Tyrock screen equipped with 2½-, ¾-, and 3/16-in. sq. openings. Plus 2½-in. stone reduced in a 4-ft. Symons cone crusher, is returned in closed circuit to the belt feeding the screens by a 24-in. belt conveyor. The products retained on the two lower decks are transported to another 5- x 14-ft. triple-deck Tyrock screen by a 30-in. belt conveyor where final sizing is made. The prod-

uct passing the lower deck is flumed together with wash water to a stockpile adjacent to the plant. This product, minus 3/16-in., sold during the war years as sub-base and surfacing treatment aggregate for airports, has found acceptance today as asphalt filler and concrete block aggregate.

The final screen, equipped with ¾-in. sq. openings on the top deck, ¼- x ¾-in. openings on the middle deck, and 3/16-in. openings on the lower deck, produces four finished sizes that are stored in bins underneath,



Above: Flowsheet of crushing and screening operations before the improvement program started in 1942. Below: More flexible screening and crushing facilities in the modernized plant flowsheet



H. S. Satterwhite, office manager, to the left, and J. D. Stowe, superintendent

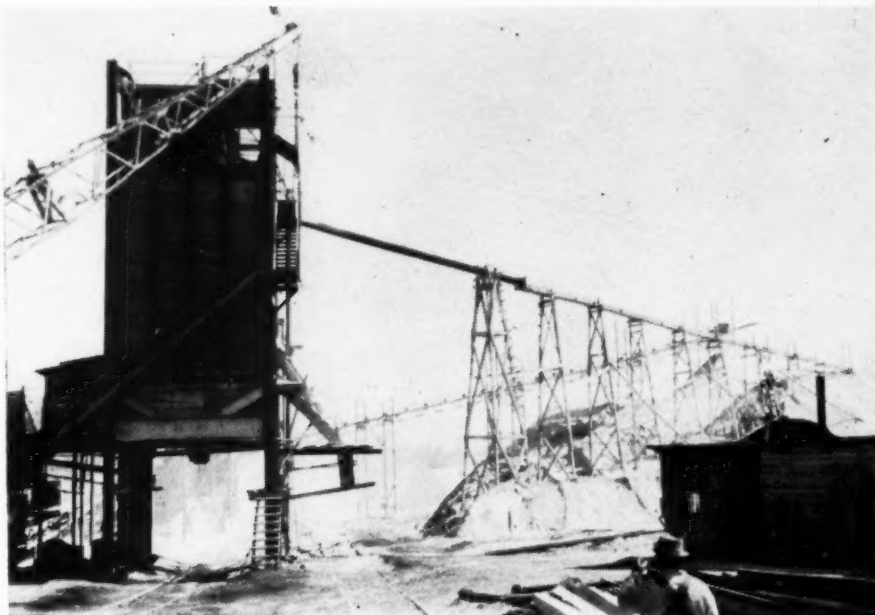
with the exception of the minus 3/16-in. stone which is conveyed to the stockpile. This stockpile, which has been built up to contain about 1,000,000 tons, is also served by an International TD-18 diesel crawler tractor that moves the fines up on the pile. The fines are loaded from the stockpile by a Link-Belt crane with a 1-cu. yd. bucket.

Wash water is pumped by an 8-in. centrifugal pump to spray pipes above the upper and lower decks of the screen. The wash water accompanying the fines to the stockpile drains to a pond some 700-ft. from the plant where it is picked up by the pumps for re-use.

Quarrying

A 76-ft. face of granite is quarried, using four Sanderson Cyclone well drills and one Keystone well drill. Holes, spaced at 24-ft. centers with an 18-ft. burden are drilled 3-ft. below the quarry floor to eliminate toes.

Secondary blasting is handled by 12 Ingersoll-Rand jackhammers for



Fines are flumed to huge stockpile, to the right. In the rear is the conveyor which delivers fines to stockpile from final screening operation

drilling. Secondary breakage is also handled to some extent by a drop ball, consisting of an 8000-lb. ball attached to a new 38-B Bucyrus-Erie crane. The "drop ball" is raised to a height of about 25-ft. and released over the stone. An International TD-18 Diesel crawler tractor with Heil cable dozer pushes scattered rock into piles for easier recovery by shovels. This equipment also is used for stripping overburden, which averages about 3-ft. in thickness. Stone is loaded by two No. 50B Bucyrus-Erie electric shovels with 2-cu. yd. buckets, and a 80D Northwest shovel with a 2½-cu. yd. bucket. Quarry haulage is handled by four 12-cu. yd. Easton trailers, two 15-cu. yd. Euclid rear-discharge

trucks, and two new Easton double-bodied trailers, each body having a capacity of 8-cu. yds., or 16-cu. yds. for each unit. Stone in the new Easton units is dumped into the crusher 8-cu. yds. at a time, thus preventing choking the crusher, since a load of 16-cu. yds. placed in the crusher could not be handled.

About 75 per cent of the present market is ballast for the Atlantic Coastline Railroad. This product is sized from 2½-in. down, and due to the large demand, about 500,000 tons per year is provided.

U. S. Super Highway System

ROUTES AND SPECIFICATIONS have finally been approved by Federal Works Administrator Gen. Philip Fleming for inclusion in the national system of interstate highways, and comprises the most heavily travelled highways in the Federal-aid system. The north-south, east-west and diagonal highways will make it possible to travel to any section of the country by a direct route. The system will contain 37,681 miles of the nation's principal highways and will serve 42 state capitals. Congress has authorized \$500,000,000 to be spent for the program in each of three fiscal years.

Ohio Geological Map

GEOLOGICAL SURVEY OF OHIO has announced publication of the "Geologic Map of Homes County, Ohio," showing the areas of the county underlain by the Logan Formation of the Mississippian System and the Pottsville and Allegheny formations of the Pennsylvanian System. Copies may be obtained from the Survey, Ohio State University, Columbus 10, Ohio, at a cost of fifty cents.



Looking down into quarry from top of plant. Primary crusher is located in the quarry where truck may be seen dumping to hopper

Accident Prevention



Safety has been built into this long conveyor structure from quarry to plant. The walkway along the belt is of steel mesh and a substantial hand rail has been constructed to safeguard workmen

First of a series of articles on accident prevention methods which have proved highly successful in gaining the whole-hearted cooperation of foremen and workmen. This refreshingly new approach to safety can be followed with profit by every branch of the industry

Don't Look At

By WILLIAM L. ROSCOE*

SAFETY As An Iceberg

A GREAT MANY FOREMEN look upon safety work the same as one would view an iceberg, that is, they only see the exposed part or about one-fourth of the whole. The other three-fourths, being submerged, isn't seen and so isn't even thought of as being there or being a part of it.

This fact has convinced the writer that some pertinent facts, in plain understandable language, are greatly needed to bring out some all important points such as the following:

(1) Safety work is not something entirely separated from operation and production;

(2) Safety work should not be carried on in such a way as to make a simple, natural process appear complicated and difficult;

(3) The functions of any *successful* safety program must be based on good old-fashioned, every day common sense.

The Superintendent Talks to the Foremen

Some vital points and methods of application which have been tried and proven effective by the writer in reducing accidents, and therefore should

be of some help in obtaining some sort of permanent success for safety efforts of other companies, are outlined below.

The foreman should first of all realize that safety isn't like a course of instruction which when finished is ended for good.

It is a part of the work of every day and of every job.

When you as a foreman forget this and get the idea that certain jobs are so simple, or that some other jobs have been done so frequently that supervision is unnecessary, you are headed for trouble and plenty of it.

For instance, you may train a man always to keep a way to escape open for himself when doing a job of a hazardous nature. You check up on this man frequently and find that he always does as instructed.

You are very apt to say, "there is a good safe workman," and then pay less attention to him, a little less supervision. Then some time later you place him on a job where an emergency connected with his work would cut off the escape of others; that is, in an emergency he would, by following instructions, get out alright, but the others would not.

Remember, the ultimate objective is the prevention of accidents, and hence human suffering, which goal cannot

be reached if one worker is safe and uninjured at the expense of another.

It is a fine thing to train each employee always to look out for his own safety, but you must remember that this is only a start. This is but the beginning of safety education.

A good safety program needs cooperation too, and this cooperation can best be brought about by continual safety education and careful supervision by the foreman. You should always stress the logic of safety work, the integrity of the idea, and the harmony of cooperation. Accidents are costly in money and damaging to morale.

You are interested primarily in two kinds of accidents — those which involve impairment of machines and those which involve the destruction or impairment of human beings. However, some foremen argue that production is their primary and only concern, and they are not interested in whether the plant safety program works or not.

You must realize that whether or not you hold your job may depend largely on whether or not you supervise a safe department. In addition to this you have a moral obligation to the men working under you, and you are not fit for the job unless you do everything in your power to prevent the human suffering caused by accidents.

*Superintendent, North American Cement Co., and for years a very active exponent of safety measures which have worked out successfully for his company.

ACCIDENT PREVENTION

You say your primary interest is production. Did it ever occur to you that safety and production are so closely tied in, and that one is so dependent on the other that it is practically impossible to do a good job of one without doing a good job of the other?

Eliminating waste, preventing loss through destructive fires, uninterrupted operation of machines, and uninterrupted operation through lost time by employees due to accidents are the cardinal rules for doing a good production job.

These are the very things that intelligent safety work eliminates.

In view of all this, how can you take the attitude "Why should I care whether the plant safety program works or not?"

Due to various other responsibilities of all foremen such as maintenance, production, and so on, safety work is of necessity only a part time activity. This fact does not, however, offer any excuse or open a way for any effective argument for you to place safety work any where but on a par with any and all of your other duties.

Most accidents are the result of the failure of man power, and unless you as a foreman intermingle safety instructions with job instructions every day on every job, the foremost accident hazard will continue to exist; that is, the individual worker who has not had the proper instructions nor had the safety idea drilled into him to the extent that it has become second nature.

If you will do a good conscientious job of discussing job hazards in advance, every day, on every job, you will automatically develop yourself into a real safety-minded foreman and at the same time, will be setting a good example for your men. By following this method with no let up, you will find it to be the best possible way of convincing your men that you are sincere, that safety is not just a side line with you or just a job wished off onto you. This is an all important point which you should by all means grasp because your interest or lack of interest in safety, as accepted by your men, will leave its mark on the entire organization according to its nature. They will take their cue from your attitude.

The one thing that will prompt men to do their utmost to achieve any goal is to know that their foreman knows exactly how to lead them.

You must realize that in order to sell safety to your men you must first be sold yourself. You must be sold with the safety idea before you can become a real safety leader. You must realize that men are not naturally careless but rather that they have acquired the habit of careless thinking, and that it is up to you as a safety leader to change their way of thinking by convincing them of the value of

safety and instilling in them a desire to want its advantages.

Delegate Some Safety Responsibility

If you will study the activities of the men in your department, you can not help but observe that, except for the very lowest rank, to every worker there are some executive functions entrusted.

These men all have their personal work and their executive work. The personal work they must do themselves, but beyond that they do, in some degree, direct and guide the work of others.

Take these groups for example.

A repairman and his helper, a shovel operator and his pitman, a blacksmith and his helper, and so on throughout the entire organization you will find many men who, to a certain extent, guide and direct other men in their work.

This minor executive work is only administrative while real executive work is both administrative and creative. Now, if you will watch these men closely, and to those who discharge their administrative work faithfully, delegate some safety responsibility their executive work will automatically become creative as well as administrative. You will find this method very effective in building a safe organization and getting men interested in safety work. All this, however, does not lessen your responsibility for the safety of your men.

The long and short of it is this:

Organization is the key to success in safety work. Guiding, directing and organizing is the essence of executive work. Therefore, if you are to build a safety organization in your department you should not hesitate to put some measure of executive work, however small, on the shoulders of anyone who can bear it. Every man above the lowest rank should have some of it to do and this should be increased according to the man's ability.

A good safety organization must grow. It cannot be assembled in a few days like a piece of machinery.

You will find that an assembled safety organization will not hold together for any length of time. On the other hand, by delegating some safety responsibility to some of the better men, a lasting organization will grow, in which everyone connected with it will work together effectively in getting the same principles of effective activity across to all the other workers.

This will bring about willing cooperation and teamwork which are the fundamentals of a real safety organization.

To a certain extent the key men in your department accept your operating problems as their problems. By delegating some safety responsibility to these same men, they will soon come to accept your safety problems as their problems.

They will soon come to realize that the safety problem is just another phase of the operating problems in which everyone is interested and is striving to improve.

In other words, they will come to realize that operation and safety are two phases of one job, exactly the same as in the case of a major league ball player. No matter how good a fielder he is, he must also be a good hitter if he is to make the grade.

How to Make Safety Rules Work

You cannot solve the safety problem by formulating and then attempting to enforce numerous safety rules.

In the first place, it is impossible to enforce a great number of safety rules, and a rule not enforced is a detriment to the cause.

In the second place, too many safety rules tend to imply that safety work is something entirely separated from the job itself, and this is just a condition we are trying desperately to avoid.

It was stated above that it is im-



Loading stone into quarry haulage unit. Note steel plate over truck cab protecting driver from stone that may fall from bucket of shovel

possible to enforce a great number of safety rules. I would like to stress this point by adding that it is impossible for you to enforce *successfully* any general safety rule unless it is so formulated that some individual, other than yourself, is made responsible for its application.

As an illustration, let us examine this general safety rule:

"No person without proper authority is permitted to ride on a locomotive or train."

Suppose some person, perhaps to save himself some footsteps, knowing you are in conference or otherwise occupied, decides to ride this locomotive or train. What is there to prevent him doing so? Who is to stop him? No one but you or some other supervisor has the authority to stop him, and you are not there. What will happen?

The chances are he will ride, which means, the rule has not been enforced.

These things can and do happen every day.

You can readily see that a rule of this kind is not practiced because it can not be *successfully* enforced.

Let us rewrite this rule with the idea of making some other individual responsible, not for its enforcement, but rather for its application.

"No locomotive engineer shall move a locomotive or train while anyone without proper authority is aboard."

You can plainly see that in this rule, one man, the engineer, is responsible for the application of the rule. In fact he has, through this rule, definite orders which he will obey, while in the other form of rule no one has any definite orders, nor is any one responsible either for its enforcement or its application.

Remember, there is a vast difference between enforcement of a rule and application of a rule.

Let us examine another general rule in which failure to place responsibility would undoubtedly render the rule useless.

"A truck driver shall not remain in the cab of a truck while it is being loaded with a power shovel."

Again you can see that no definite responsibility is placed for its enforcement or application other than the constant surveillance of yourself or some other supervisor, which is, as you know, not only impractical but impossible.

Now, let us rewrite this rule in a way that one man is held responsible for its application.

"The shovel operator shall not load stone in a truck until the driver is out of the cab and in the clear."

Here we have another rule, which although in its original form could not be *successfully* enforced, is easily made effective by formulating it in such a way as to place the responsibility for its application on one man, in this case, the shovel operator.

Unfortunately the number of gen-

eral safety rules which can be so written as to place the responsibility on some individual is limited. In fact there are but very few.

Appeal to Self-Preservation

You might ask, what are you to do about all the rules you now have in effect? Your book of rules which you give each employe? Your posted rules in different departments? Should you discontinue them and have only the few which place responsibility?

The answer to these questions is definitely no.

You should, however, endeavor to change all rules in which responsibility cannot be placed, into a form of suggestion which will appeal to the man's self-preservation instinct, if you expect to get the most out of the rule.

As an illustration, you have a rule which forbids grinding on an emery wheel without wearing goggles. In addition to this you undoubtedly post a sign at the emery wheel saying, "Positively no grinding on this wheel without wearing goggles."

As you know, it seems to be human nature for most men to want to do the things which they are told they cannot do. The reason for this is just as difficult to explain as it is to explain why it is natural for men to like to gamble. Nevertheless they are facts.

Therefore, the above rule will be accepted by most men as a challenge and they will look in all directions, and if there is no one in sight will do exactly what the rule and sign tells them not to do.

The principal reason for this behavior is the fact that neither the sign nor the rule explains in any way how the man is to benefit by abiding by the rule. He only sees a challenge.

Let us view it from another angle. Suppose you change this sign to read something like this: "Without your eyes, what could you do? Goggles protect them; remember this when grinding on an emery wheel."

You can plainly see that a sign of this kind would appeal to the man's self-preservation instinct, and he would readily see that he has everything to gain and nothing to lose by wearing goggles for his own personal protection.

Briefly, safety rules, to be effective, must be formulated in such a way as to appeal (by suggestion) to a man's self-preservation instinct or make some individual responsible for their application.

Attempting to enforce any other type of safety rule is a waste of time and will not be of any benefit to you in your accident prevention work.

You might say that you have nothing to do with formulating safety rules, that they are formulated by top management and passed on to you with orders to enforce them.

This, no doubt, is true, but still you

are responsible for the safety record of your department. All that top management is interested in is results.

You must remember that this same top management sold you on the safety idea so that you have become sincere. They most certainly did not accomplish this by enforcing a lot of rules. It was brought about by education and this, in the long run, is the only way in which you can make your men sincere, by educating them to the extent that they want to work safely and prevent accidents.

You must remember too that during the period of your safety education your superiors had to resort to certain rules to carry them through until such time as your education was far enough advanced that you were prepared and capable of handling the safety work in your department. From this time on, your superiors are not so much interested in the methods you use as they are in the results produced. You must remember that you are the vital point of contact between management and worker.

You are definitely an important part of management. Your duties are meeting situations and directing events in such a manner that the over-all objectives are met.

A qualification which your superiors demand in their foremen is initiative. By initiative is meant the ability to think and do new things. If you lack it you get into a rut. If you have it you are happiest when you are springing something new on your superiors.

You are always looking for new and more efficient ways of getting things done. Management is expecting this.

So in view of the fact that management is holding you responsible for the safety of the men in your department, does it seem reasonable to believe that they would object to your taking the initiative and going ahead to formulate and put into practice new safety rules which you believe would be beneficial to the accident prevention cause?

Your superiors fully realize that safety-mindedness is an educated belief, and they will sanction any and all methods you may adopt to further this education.

EDITOR'S NOTE: Concluding article to follow will deal with the problem of the right approach to the new man.

Sand and Gravel Picture

A MOTION PICTURE depicting the production and distribution of river sand and gravel has been completed by the Keystone Division of Dravo Corporation, Pittsburgh, Penn. Entitled "The Story of River Sand and Gravel," the picture, although showing operations of the Dravo Corporation, is more or less representative of the sand and gravel industry in general in the Pittsburgh area.

COLORIMETRIC METHODS for Rapid Analysis

Review of Swedish publication on
the use of colorimetric methods for
rapid analysis of silicate materials

By W. C. HANNA*

COLORIMETRIC METHODS for Rapid Analysis of Silicate Materials" by RUNE HEDIN, Swedish Cement and Concrete Institute at the Royal Institute of Technology, Stockholm, 1947, 110 pages, will interest cement chemists in this country but probably disappoint those who are looking for a drastic reduction in the time required for the determination of the usual oxides.

Getting a silicate into solution is one of the most time-consuming parts of a gravimetric analysis, and colorimetric analysis goes farther in requiring the complete solution of the silica. Both the Standard and Alternate A.S.T.M. Methods of Chemical Analysis for SiO_2 , Fe_2O_3 , Al_2O_3 , CaO , MgO , Na_2O , and K_2O in Portland Cement require three solutions of the sample, one of which, that for the determination of Fe_2O_3 , can be made in a few minutes.

The author's colorimetric scheme also requires three solutions, which he says can be made by a skilled analyst in 87, 93 and 125 minutes. He uses one potassium sodium carbonate fusion for SiO_2 , Fe_2O_3 , TiO_2 , and Al_2O_3 , and another for CaO and MgO . Making these solutions is faster than the double evaporation of the Standard A.S.T.M. method, but much slower than the HCl — NH_4Cl digestion of the Alternate A.S.T.M. method.

Preparing a solution for the colorimetric determination of Na_2O and K_2O by fuming off the sample with HF and H_2SO_4 , leaching, neutralization with NH_4OH , and filtering can be accomplished somewhat faster than the Alternate A.S.T.M. perchlorate method and much faster than the Standard A.S.T.M. CaCO_3 fusion, etc.

After the solutions are made, the author points out, the chemical conditions must be so adjusted that there will be no interference in the color from other elements which also react with the color-forming reagent. This may be accomplished by close control of the pH or by the presence of other

chemicals, but it may require an essentially complete separation of the element to be determined. In such a case, the only advantage of colorimetric analysis will be the substitution of the measurement of volumes of sample and additive solutions, standing, and the photoelectric measurement of the color for the gravimetric operations of ignition and weighing.

This may not be an advantage, as in the case of the determination of CaO , where the author admits that it is easier to dissolve the oxalate precipitate in sulfuric acid and titrate it with permanganate than to get it into a solution whose color can be measured. And though a colorimetric scheme is offered for Na_2O and K_2O , these elements must be precipitated as sodium zinc uranyl acetate and potassium chloro-platinate, the former allowed to stand for two hours, etc., and the latter evaporated to dryness; so it would seem easier simply to dry and weigh the precipitates.

To sum up the colorimetric scheme from a time standpoint, the author, by careful interspersing of operations, makes a complete analysis in an eight hour working day with some short periods of free time. This compares favorably with the Standard A.S.T.M. Methods, unfavorably with the Alternates.

The colorimeter used for making the measurements was a comparatively simple instrument designed at the Institute. To avoid the chief source of inaccuracy in colorimeters, the difficulty of controlling the light source, a double photocell colorimeter was provided with two photoelectric cells connected in a compensating circuit exposed to one source of light. Monochromatic light was obtained from a simple mercury discharge lamp fitted with carefully selected filters. Two wave lengths were found sufficient for the entire analysis scheme presented.

The thoroughness with which both the theoretical and the practical considerations were worked out is shown by a comparison of results of analyses of samples of kaolin, cement clinker, glass wool, brick material, mica ma-

terial and open hearth slag by classical gravimetric methods and by the colorimetric procedures suggested. The agreement is extremely close.

Cool Aggregate

SPECIFICATIONS for concrete aggregate at the Davis Dam on the Colorado river require that it be no hotter than 80 deg. F. when placed in the mix. As temperatures in the section of the valley floor where the dam is being built are regularly over 100 deg. during the long summer season, a cooling system became mandatory. Aggregate, produced by a subcontractor on the Nevada side of the river, is stored by the concrete contractor, Utah Construction Co., on the Arizona side of the river.

By erecting a roof over the aggregate stock piles, the amount of ice required to cool the aggregate has been materially lessened. The roof is built on a rock sidehill and covers four compartments to hold various sizes of stone. Stone is dumped from trucks that operate on a road along the top of the hill, and is reclaimed by means of a conveyor belt operating in a reclaiming tunnel. Material is transferred from the stockpiles to a batching plant. Sand is kept in an adjoining stockpile, not protected by a roof, as the insulating qualities of sand do not allow heat to penetrate to any great extent. The roof also allows better moisture control of the mix due to the fact that it protects aggregate from rain.

The dam is to be a 4,000,000-cu. ft. earth and rock fill, with spillways, intake structure, power plant, etc., constructed of concrete.

Mexico's New Cement Plant

IN THE March, 1948, issue of ROCK PRODUCTS, pp. 80-82, an article was published about the recently completed cement plant of Cemento Portland Nacional, S. A., Hermosillo, Sonora, Mexico. The editors wish to express to Edwill B. Smith, plant manager, our appreciation for his courtesy in supplying information, drawings, and photographs for its preparation. This plant was recently opened with ceremonies in which dignitaries of the government of Mexico and the State of Sonora were in attendance.

Safety Provisions For Conveyors

THE FIRST nationally acceptable safety provisions for the construction and operation of mechanical conveyors and conveying equipment have been made available. Safety provisions for all types of conveyors are included in the Standard and copies may be obtained at a cost of 90¢ from the office of the American Standards Association, 70 East 45th Street, New York 17, N. Y.

*Chief chemist, California Portland Cement Co., Colton, Calif.

Pacific Northwest's Newest Insulation Plant

PRODUCTION got under way in April at the Carney-Pacific Rockwool Co.'s new, modern insulation plant at Longview, Wash., on the Cowlitz river.

The plant is an affiliate of the Carney Co., Inc., manufacturers of rock-wool, masonry cement, natural cement, and agstone at Mankato, Minn. Harry E. Carney, Jr., grandson of the founder of the Carney Co., is president of both corporations. Carney-Pacific is a corporation owned jointly by Western and Midwestern investors.

The new plant, constructed primarily to serve the Pacific Northwest, will produce approximately \$1,500,000 worth of insulation annually, according to President Carney. The larger portion of the production will be Carney Golden Fleece batts, both 3-in. and

2-in. A late type Carney batt machine and oven have been installed.

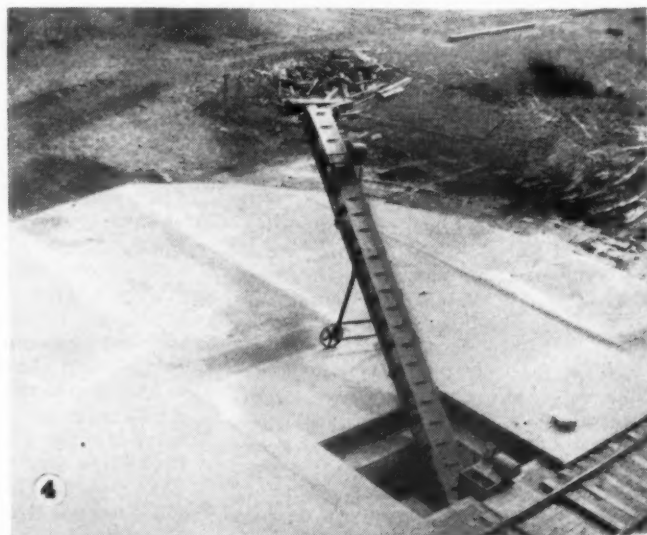
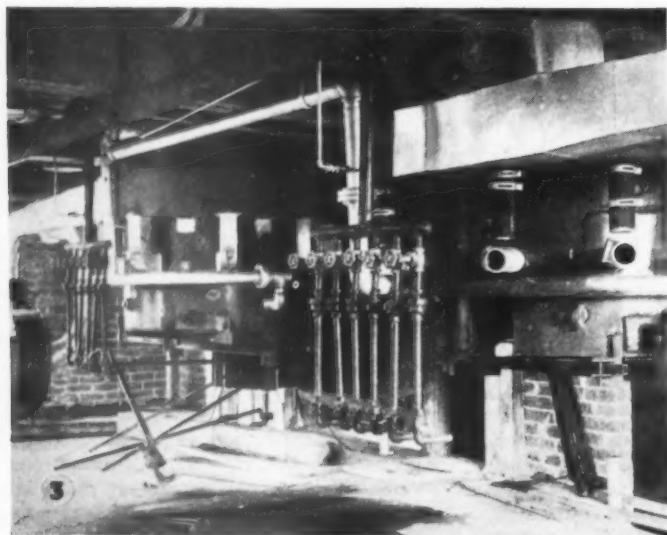
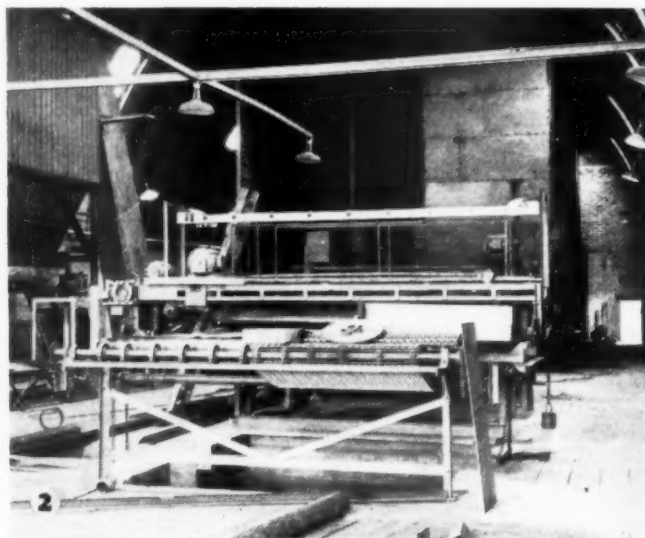
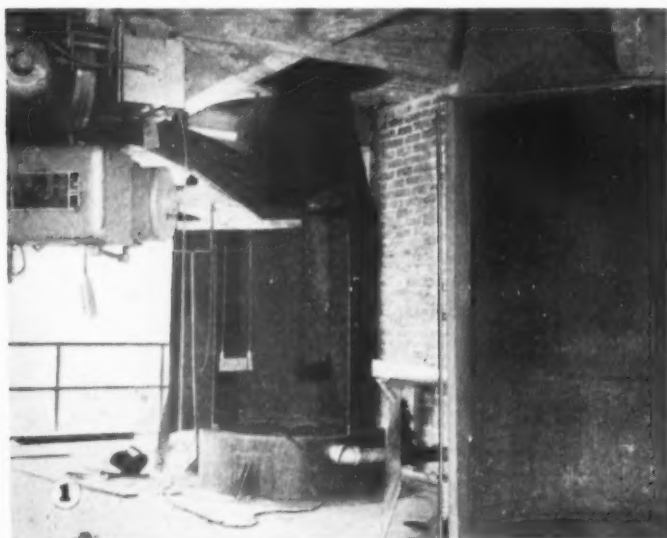
Longview, Wash., plant is approximately 300 ft. long and 80 ft. wide. It will house two production lines, one to be used for the manufacture of granulated wool, or Carney Silver Fleece. The other line will be used for manufacturing Carney Golden Fleece batts.

Raw material will consist of blast furnace slag from steel mills at Kaiser, Calif., and at Geneva, Utah. Raw materials at present are arriving at the plant by rail, although the plant is so located that it will in the future be able to receive shipments by water. The Carney-Pacific Co. will also be able to ship its furnished products via water, through the Port of Longview.

A modern monorail system, manufactured by the Louden Manufacturing Co. of Fairfield, Iowa, handles raw materials. These materials are received in bottom dump gondola cars handled by a short under-the-track conveyor, and is distributed and stored on a large concrete platform by a portable unloading conveyor. The material is loaded into the charging bucket at ground level, lifted to the charging floor by an electric hoist, and then charged into the cupolas by means of a Louden Motoveyor.

Cupola Installation

Two types of cupolas have been installed. One is a straight conventional type, 50-in. diameter with water jacket, which is manufactured for Carney-



Views of new rock wool plant just before it was placed in operation. Fig. 1: Cupolas with automatic charging equipment, above to the left. Fig. 2: Batt machine before it was completely assembled; oven not installed. Fig. 3: Two cupolas taken on the firing floor. Fig. 4: Raw material is received and stored on concrete slabs with radial stockpiling conveyor

Carney-Pacific Rockwool Co., Longview, Wash., started operations in April at its modern rockwool plant which will produce both granulated wool and batts. Design special cupola and batt machine for new plant. Raw material is blast furnace slag. Production value will be \$1,500,000 annually

Pacific by Murray Iron Works. The cupola producing granulated rockwool is also manufactured by Murray.

A horizontal fire-tube boiler provides the steam needed for blowing the wool at 100 lb. pressure. This boiler is fired by a No. 8, 175 hp. Ray oil burner.

The company has erected its own water pumping station on the Cowlitz river to provide water for both cooling purposes and boiler use. This water is treated with Nalco products, furnished by the Flox Co. Water is pumped from the river by Fairbanks, Morse water circulating pumps.

Blow chambers into which the wool is blown are approximately 8- x 22- x 50-ft., provided both with downdraft equipment and emergency ventilation to the atmosphere.

The buildings have been erected on property owned by the Carney-Pacific Rockwool Co. The plant is served by two spur tracks, one for incoming materials at a higher elevation, the other for outgoing materials, at a lower elevation, on a level with the shipping room floor.

The plant is well lighted, well ventilated, and is equipped with locker rooms for men and women. The main portion of the building is of fireproof construction with a fire wall separating the main production building from the warehouse.

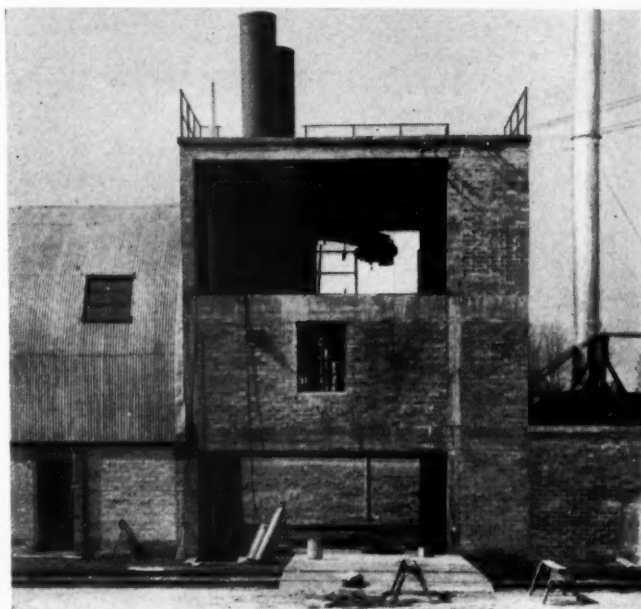
Longview was chosen as the site of the new plant because of its strategic location in the Pacific Northwest. It is on deep water and is served by four mainline railroads, all of which have track connections directly to the property. Low cost power, an ample supply of labor and the possibility of shipping by water to Hawaii, San Francisco, Alaska and the Orient were other determining features.

Carl Heim is a vice-president in charge of operations for the Carney-Pacific Rockwool Co.

Operates New Crusher

ANDERSON BROS. AND OXANDALE, Holton, Kan., has placed in operation a new crusher and hammer mill plant at its quarry. The crusher is a Uni-

Cupola end of rockwool plant. Raw material is stored on concrete slab in foreground



versal Engineering Corporation machine, and has a capacity of 70 cu. yds. per hr. The Anderson and Oxandale firm has contracted to spread agricultural limestone over several townships in Nemaha and Jackson counties.

Lime Plant Cuts Fuel Costs By Furnace Development

NEW ENGLAND LIME CO., Adams, Mass., has been engaged for the past two years in developing a new-type furnace which is expected to cut fuel costs in half. From 1946 to 1948, the cost of fuel oil per ton of lime has gone up 51 per cent, according to C. C. Loomis, president. The company is now installing a 100-ton per day furnace at a cost of \$200,000, which is expected to be in operation by early 1949.

The company's precipitated chalk and ground limestone tonnage this year should increase due to improved operating techniques, according to Mr. Loomis. Its magnesium plant at Canaan, Conn., owned by the War Assets Administration, is engaged in a research program for the government.

Diamond Drilling Limestone

STUDIES at the Bell limestone mine, operated by Warner Co., Philadelphia, Penn., revealed that diamond-drilling blast holes in stopes, or excavations, reduced hazards, broke more tons of rock to each foot of hole drilled, and cut the consumption of blasting powder almost in half, according to a Bureau of Mines report issued recently. The Bell mine produces about 600,000 tons of limestone annually.

A shrinkage-stopping mining method, which uses part of the rock for support and as a working platform, is followed. Blast holes were diamond-drilled for the first time at this mine

in July, 1946. By February, 1947, six drills were in operation two shifts per day. However, machine upkeep is higher than for percussion drills; charging and shooting long holes was more difficult; and percussion drills were needed for development of headings and certain phases of stoping, where diamond drills could not be used successfully.

Information circular No. 7429, "Diamond-Drilling Blast Holes, Bell Mine, The Warner Co.," by McHenry Mosier, chief, College Park Branch, mining division, Bureau of Mines, U. S. Department of the Interior, may be had by writing the Bureau of Mines, Pittsburgh 13, Penn.

Enters Brick Industry

BASIC REFRACTORIES, INC., Cleveland, Ohio, has announced plans to expand its Maple Grove, Ohio, plant to provide facilities for the manufacture of basic brick used in the lining and relining of rotary kilns, industrial furnaces and in basic open hearth and electric steel furnaces. The new facilities are expected to be ready for production by the latter part of the year, and the plant will be the only one of its kind in the Midwestern area. Formerly the plant concentrated on the manufacture and sale of granular dolomite, magnesite and chrome refractories. In addition to rotary kiln and heating furnace brick, Basic Refractories, Inc., plans eventually to make a line of basic brick, fired and unfired, for use in the basic open hearth and basic electric furnace industry.

Install New Stone Drier

WOODVILLE LIME PRODUCTS CO., Woodville, Ohio, has installed a new stone drier equipped with dust collectors in an attempt to alleviate the dust problem on the north side of the city.

Crushing

Rapid Change-over From AGSTONE to ROADSTONE

Pontiac Stone Co., Pontiac, Ill., designs crushing and screening layout of McDowell plant for quick change-over from agstone to roadstone production. Unusual drilling set-up by mounting drill on truck turntable

By DAVID MOCINE

A NEW QUARRY was opened this year by Pontiac Stone Co., Pontiac, Ill., as the company's answer to greatly increased demand for agricultural limestone in this predominantly corn-producing area of the Midwest. The original quarry, located on the opposite side of town, proved of insufficient capacity to meet demands for both spreader trucks and rail shipments at the peak season of the year.

Rated at 160 t.p.h. agricultural limestone production and a little higher when producing road stone, the McDowell plant of Pontiac Stone Co. required 1½ years to complete. The basic flow sheet was drawn up by Smith Engineering Works, with modifications and refinements worked out in the course of construction by Joe Acklin, general superintendent of the

company's two quarries. As the plant is located in flat prairie country, agricultural limestone is produced and spread in the winter months, with summer-month production being chiefly road stone.

Profiting from operation of two former quarries, the new plant embodies the utmost in economy of operation; not only in machinery particularly suited to the type of stone quarried, but also in simplicity of change-over from agricultural limestone to road stone production. Change in flow for either type of stone is made at the secondary crushing station, where minus 3-in. material is drawn from a 30-ton surge hopper and diverted to either of two hammermills, operating in parallel for agstone production, or to a Gyrasphere crusher when road



Al Markgraf, left, one of the owners, with Joe Acklin, general superintendent. Leo Lamb, the other partner, was not present when picture was taken

stone is desired. All secondary crushers discharge to a common 30-in. collector belt conveyor, 30 ft. centers, which discharges to No. 2 conveyor belt for elevation to secondary screens. These screens are mounted above overhead storage bins which permit loading either to rail or truck haulage units.

Quarry Equipment Additions

A 1-cu. yd. gasoline powered shovel loads three 5-ton end-dump trucks for the 2200-ft. haul to the primary crusher. Quarry equipment is to be replaced with a 1½-cu. yd. Koehring Diesel shovel now on order and 3-ton Ford trucks. Stone at the location is highly fragmented, requiring no secondary blasting.

Stone is dumped by trucks to a 10-cu. yd. surge bin at the plant. From the bin, stone is fed by a 4- x 12-ft. Tel-smith heavy duty apron feeder to the primary crusher passing over a 4- x 8-ft. American Manganese grizzly plate with 3-in. openings, set at 45 degrees. Minus 3-in. material through the grizzly by-passes the primary crusher and is chuted to the belt receiving the crusher discharge. The primary crusher is a Tel-smith 16-B gyratory, with the opening set for 3-in., discharging to the No. 1 belt conveyor. No. 1 conveyor is a 30-in. belt, 137 ft. centers, that elevates the crushed material 35 ft. to the secondary crusher station previously mentioned. All equipment is driven by electric motors with current supplied by the power company. The apron feeder is powered by a 3-hp. motor, the primary crusher is belt-connected to a 75-hp. motor, and No. 1 conveyor is powered by a 15-hp. motor through a Falk speed reducer.



General view of plant showing truck dumping to primary crusher, to the right, conveyor inclining up to secondary crushing plant, and final sizing plant and storage bins



Hammermill, to the left, for agstone production, and gyrasphere, to the right, for roadstone discharge to a common belt

No. 1 conveyor discharges over a Stearns magnetic pulley to a 4- x 8-ft. Telsmith double-deck vibrating screen, with 1-in. mesh on the top deck acting more as a scalping screen to protect the bottom deck of 3/16-in. mesh. Oversize on the two decks falls to the 30 ton surge bin, while throughs on the bottom deck, minus 3/16-in., bypass the secondary crushers and are chuted to the belt receiving the secondary crusher discharge.

Easy to Change Over from Agstone to Road Stone Production

When the plant is producing agricultural limestone, minus 3-in. material is drawn from the secondary surge bin into two Telsmith pan-feeders serving two Allis-Chalmers hammermills, a No. 524 and a No. 3. Both mills, running in parallel, are set for 3/4-in. grate bar opening at 1200 r.p.m., and are powered by a 200 hp. and 100 hp. motor, respectively.

When demand is for road stone, minus 3-in. material is drawn from the same surge bin feeding the hammermills and is chuted to a Telsmith 48-in. Gyrasphere reduction unit, with variable opening, usually set for 3/4-in.



Close-up of 14-ton agricultural limestone spreader truck being loaded on scale. Quarry truck dumping its load to primary crusher may be seen in the background

This crusher is powered by a 150 hp. motor. Two basic reasons for using the crusher at this point in the flow rather than re-setting the grate bars of the hammermills is better sizing of road stone from the Gyrasphere, plus greater production.

All three secondary crushers are mounted in line and discharge to the same 30-in. feeder belt on 30 ft. centers, which in turn discharges to conveyor No. 2, a 30-in. belt, 165 ft. centers, for elevation of 65 ft. Material thus elevated is discharged to a pants leg chute which divides the flow to two 4- x 12-ft. Telsmith double-deck vibrating screens, operated in parallel, each powered by a 7 1/2-hp. motor. Sized material from these screens is chuted to truck and rail car loading hoppers directly below.

The top deck on these screens, 1/2-in. mesh also acts as a scalper. The bottom deck on both screens is 3/16-in. mesh, with oversize going to an auxiliary hopper for truck haulage to waste and throughs falling to the agricultural limestone bin of 175-ton capacity for loading out orders or haulage to stockpile. Mesh sizes of these screens are of course changed when the plant is producing road stone.

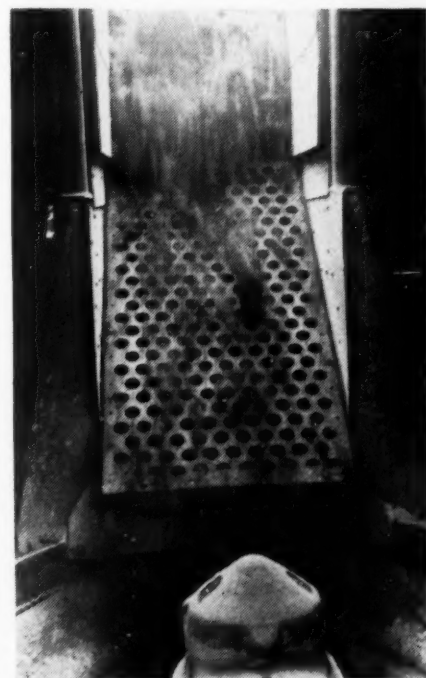
At this point in the plant flow, three changes are to be made as soon as orders permit a work stoppage. Already purchased and on hand are belt conveyor systems for stockpiling agricultural limestone or road stone over a series of reclaiming tunnels large enough for trucks to enter and load from gates in the tunnel. A second addition to plant flow, important in over-all plant economy, is a conveyor and chute system for returning oversize at the secondary screening station to the secondary crushers in a closed circuit, via the same belt carrying primary crusher discharge. The third addition, to be installed in the immediate future, is a Weightometer for checking rail carload weights.



Lower end of gyrasphere crusher, upper left, with chute to the right carrying 3/16-in. material from screen which by-passes crushers. Collecting belt, below, takes the product from the three secondary crushers

Rail and Truck Weighing and Loading

With the variety of different makes, sizes and ages of both gondola and hopper-bottom cars now being loaded at any one plant, it has become impossible to gauge by eye the infinite number of allowable weights the cars represent. Originally planned for gravity chute loading of rail cars on the company siding that parallels the plant, a system will now have to be



Grizzly plate with 3-in. openings serves as a scalper-chute into gyratory crusher

worked out for use of a conveyor belt at this point for installation of a continuous weight scale. The company track siding, 2800-ft. in length, is provided with switches at both ends connecting with the main line, Streator branch, Wabash railroad, which parallels the plant. Although the siding is graded for gravity spotting of cars, a car-puller is being constructed in the company shop for greater facility in car loading operations.

Truck loading facilities are provided by means of TelSmith clamshell gates directly under the bins, with the gates controlled from a glass enclosed office on the opposite side of the bins from the railroad tracks. A 30-ton, 34-ft. Winslow platform scale is provided for truck load weighing. The scale is set to compensate for the weight of the empty truck; the poise set at the desired weight of agricultural limestone or road stone to be loaded, and the bin gate opened until the scale is in balance.

Land for the quarry operation is leased from a farmer-owner on a royalty per ton basis. Test holes have been spotted over 35 acres immediately adjacent to the plant, showing an average of 20-ft. of good rock, covered by an average overburden of 3-ft. Overburden is light in nature and is removed by an Allis-Chalmers HD-14 tractor pulling a Gar Wood 12-cu. yd., struck capacity, hydraulic scraper. Quarrying is carried out on 10-ft. ledges, with water being encountered during removal of the second ledge.

The limestone deposit in this area

is called the Pontiac formation, as there is some uncertainty in geologic circles whether it should be classed as Lonsdale or LaSalle. Fossilized shell remains are plentiful, especially in about a foot of rock which lies directly on top of the shale member. The deposit yields a 99.5 per cent CaCO_3 limestone, which the plant processes to a fineness of 90 per cent passing No. 8 mesh.

Because of the fragmented nature of this deposit, no secondary blasting is found necessary. The primary blast consists of 2 1/4-in. holes, 12-ft. deep, loaded with 2- x 8-in. 40 per cent straight, dry, dynamite cartridges, with as many as 35 holes detonated simultaneously by electric blasting caps and a hand generator. Drilling for these blasts is accomplished with a modified wagon drill of A. E. Markgraf's design. Mr. Markgraf and Leo Lamb own Pontiac Stone Co. as a partnership.

Drill on Truck Turntable

The drill rig is particularly adapted to the type of blasting carried on at the McDowell plant, and is essentially a pneumatic Cleveland wagon drill mounted on a 3-ton truck chassis. Four holes, spaced 5-ft. apart and covering the perimeter of an 8-ft. diameter circle, can be drilled from one set-up with this unusual rig. Mounted on the truckbed is a large turntable that carries the drill and swings in an arc of 270 degrees. The drill turntable is easily turned from one side of the truck to the other by one man.

The plant office is housed in an enclosed side of a 40- x 60-ft. quonset-type corrugated steel building, with the remainder of the structure devoted to garage and machine shop for plant maintenance. Immediately between the shop building and the plant is located a transformer station, where commercial current of 33,000 volts a.c. is stepped down to 440 volts. All motors and electrical equipment in the plant are connected for 440 volts. Corrugated asbestos siding covers the two main conveyor belts, which are mounted on Continental Gin Co. idlers.

Because the plant was built at the height of the equipment shortage, management was forced to install almost as many different makes as there are motors in the plant. The three largest, driving primary and secondary reduction units, are Fairbanks Morse, General Electric and Westinghouse. Smaller motors for screens and conveyor belts are Reliance, Sterling Electric, Crocker-Wheeler and Howell. In the dust-laden air of the completely enclosed secondary screening station, Crocker-Wheeler, fully enclosed, fin-cooled motors are used. Falk speed reducers transmit power for all belt conveyors.

Little effect in business volume has been felt by the Pontiac Stone Co. in reduction of Government assistance to the farmers in the purchase of agri-

cultural limestone. No organized advertising program is carried out or contemplated; but sales of this commodity have been increasing for the past two years to such an extent that a second plant was deemed an economically sound investment.

Canada Producing Nepheline Syenite

AMERICAN NEPHELINE, LTD., Peterborough, Ontario, Canada, has started the production of nepheline syenite at the rate of 400 tons per day on a two-shift basis at its new mill. The material is crushed to a 3/4-in. size, about 150 tons of which are ground to a glass grade product of minus 28-mesh, and the remainder of which is shipped to Rochester for fine grinding and sale to American trade.

Ore is obtained from both quarrying operations and underground stopes. In the area of the original workings, diamond drilling has indicated approximately 900,000 tons of low-corundum ore plus 2,000,000 tons of high-corundum ore. The handling of high-corundum ore, however, will necessitate extra treatment and additional equipment to remove unwanted corundum, but less than a mile away, a new discovery of high-quality, low-corundum nepheline syenite has been made. Preliminary work indicates a width of some 600 ft. of the ore, which is greater than the total width of low-corundum plus high-corundum at the present workings and should eliminate the necessity of installing new equipment for some years yet.

A raise connects the underground workings through to the surface, and rock broken in the quarries is dropped down the raise to the level underground, from which point it is hauled up the incline tunnel to the crushing plant at the mill where it is reduced by primary and secondary crushing to 3/4-in. size. After being passed through an oil-fired drying furnace to remove the moisture, the product is fed to a storage bin for shipment to Rochester.

The ore used for glass-grade material also is drawn off the storage bin, reground in a short head Symons cone crusher to 28-mesh size, and delivered to the separating room where it is passed through high density magnetic separating machines for the removal of the iron minerals, chiefly magnetite. About 25 per cent of the feed is removed by the separators, but a market has been found for this product.

The addition of nepheline syenite to a glass batch decreases the melting temperature, thereby increasing the capacity of the furnace.

Lose Equipment in Fire

MIAMI SAND & GRAVEL Co., Chillicothe, Ohio, lost a large amount of equipment in a recent fire, which was said to have started with a spark from a welder's torch.



Drilling with truck mounted wagon-type drill rig designed by Al Markgraf

Cement Production, Consumption, 1947

TOTAL CEMENT produced at mills located in continental United States in 1947 was 187,396,000 bbls., or an increase of 18,060,000 bbls. over the preceding year. Amount shipped to foreign countries increased 1,968,431 bbls. over the same shipments in 1946. Internal consumption of portland cement was relatively the same by percentage in two sections: Southern and Rocky Mountain states; both Northeastern and Pacific states increased consumption slightly; and the middle states declined.

Long-term trend in consumption of cement, as measured by mill shipments, increased at a nearly uniform rate through most of 1947. California led in 1947 consumption by states with a total of 19,288,028 bbls.; followed by New York, with a total of 12,733,276 bbls.; and Texas, with a total of 11,336,679 bbls. Only six states showed a decline in annual consumption: Delaware, Indiana, Mississippi, Nevada, North and South Carolina.

Request Sealed Bids

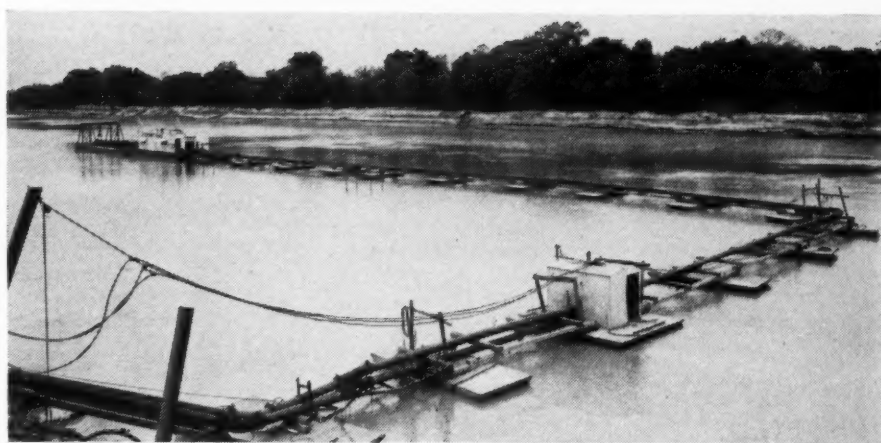
BOONE QUARRIES, Columbia, Mo., through the secretary of the company, Jack Kackethorn, recently made a request to the city council and other officials that city crushed stone purchases be made only after calling for submission of sealed bids by interested producers. Over a period covering the last 13 months, city purchases of stone have equaled more than \$12,000; with total supply furnished by two quarries, Boone Quarries' share equaling less than \$2000. The request continued by pointing out that "Boone Quarries had the latest type of equipment in its plant, and was fully able to make deliveries according to specifications."

Monarch Improvements

MONARCH CEMENT CO., Humboldt, Kan., recently held its stockholders' meeting at which present plant improvements and plans for further improvements during 1948 were discussed by Walter H. Wulf, president. Changes in the warehouse building are being made. An elevator has been installed, and stocks and equipment have been transferred from the first to the second floor. New machinery has been installed in the machine shop. Foundation work is now under way for a new kiln.

Drill Fittings Standard

COMMERCIAL STANDARD CS17-47, a revision of Diamond Core Drill Fittings (Third Edition) Commercial Standard CS17-42, has been placed in effect upon signed acceptance from a satisfactory majority of manufacturers, distributors, and users. Copies will be forwarded to each acceptor. They also may be obtained by writing to the U. S. Department of Commerce, National Bureau of Standards, Washington 25, D. C.



Dredge headed upstream in Kaw river (Kan.), with 10-in. discharge line supported on steel pontoons carrying sand and gravel to screening plant on shore

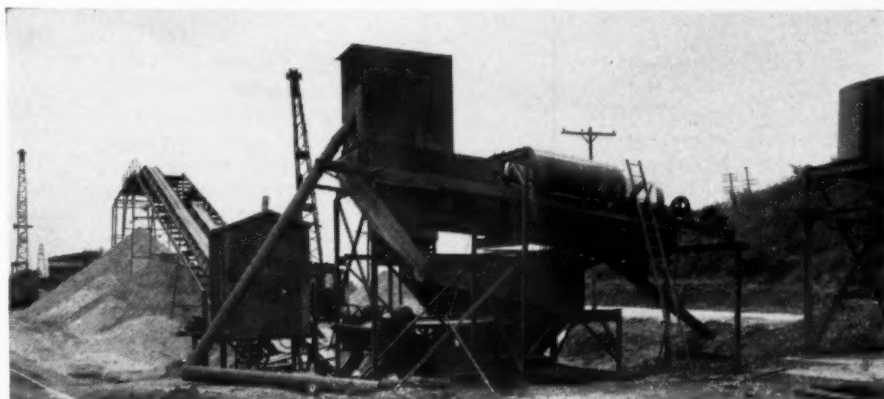
Compact Dredge

ONE OF THE PIONEER users of dredge pumps in the mid-west for aggregate production, Stewart Sand and Materials Co., Kansas City, Mo., is operating a 250 t.p.h. plant at Turner, Kan. Of structural steel design, the dredge is a compact pumping unit headed up-stream in the Kaw river.

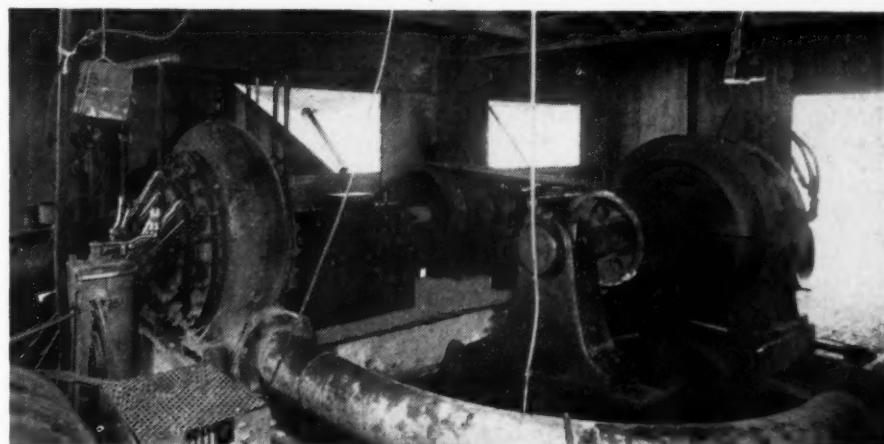
Using a traveling chain type dredging ladder and a 10-in. American Manganese Steel Co. counter-flow pump of water seal design powered by a 300-hp. Allis-Chalmers slip ring motor, solids varying from 20 to 23 per cent of capacity pumped are delivered to the screening plant on shore.

Service and seal water is delivered to the main pump by a 2-in. centrifugal pump with a 200 g.p.m. capacity at 46 p.s.i. pressure.

Freely caving materials plus the direction of stream flow both contribute to the maximum amount of solids being delivered to the screening plant. Discharge from the barge is carried in a 10-in. line supported on steel pontoons, with the main consideration being to minimize wear by removal of all unnecessary bends and turns in the pipe. Discharge at the screening plant surge box is 60-ft. above water level, with a pump speed of 540 r.p.m. and a total dynamic head of about 122 ft.



Screening plant. Note discharge end of 10-in. pipe into surge box, 60-ft. above water level



Counterflow pump driven by 300 hp. motor, showing easy arc of pump discharge line to shore



Left: Masons sand stockpiled with loader. Stockpiles are kept close together for more efficient loading of trucks. Right: Loading truck with gravel from washer with loader having $\frac{3}{4}$ -cu. yd. bucket

STOCKPILING

TEN YEARS AGO, Edward Olds, owner of Olds Lime & Gravel Co., Rock Falls, Ill., opened his first agricultural limestone and crushed road rock quarry a few miles north of town. Starting with just one truck, he has built a business that today necessitates the use of five trucks and one hydraulic loader to operate the original quarry, a pit run gravel pit and a crushed road gravel plant three miles southeast of Rock Falls where masons sand, torpedo sand, Class "A" and Class "X" gravel and pea gravel from the Rock river are processed. Mr. Olds also has the distinction of operating the only washing plant within a 25 mile radius of the twin cities, Rock Falls and Sterling, Ill.

Like many other quarry owners, Mr. Olds found that one of the main difficulties he had to overcome was the method of handling material at the three scattered pits. A Hough Model HF Payloader was placed in operation to handle this job at all three locations. The crushed road gravel quarry and the pit run gravel pit are better than a half-mile apart, but because of its speed and maneuverability, the loader is shuttled between the two, thereby eliminating the investment of two loaders that would only operate part time.

Periodically, the loader is moved to the limestone quarry north of Rock Falls to load and stockpile material. Moving the machine from one quarry to the other is a simple and fast operation, because the unit is equipped with large rubber tired wheels and can be driven on the highways at a speed of about 20 m.p.h.

In his present method of operation, Mr. Olds excavates from the Rock river with a tight line cable-way, and processes it in a screening and washing plant, which has a capacity of 150-cu. yd. per day. Material is stockpiled with the loader and then loaded into trucks at the rate of 20 to 50 per day for sale to contractors and truckers.

Modern Swiss Sand and Gravel Plant

ONE OF THE most modern sand and gravel plants in Europe is operated by Kiessandwerk A.G., and owned and controlled by Alfred Ashaetzle A.G., Luzerne, Switzerland. Methods and equipment are somewhat different than those prevailing in this country, but these practices have been adapted to labor conditions and the mountainous terrain existing in Switzerland. The immense glacial deposit comprises relatively thick beds of sand lying between thick beds of gravel, and pockets of very fine sand of close gradation. Overburden is usually about 3 ft. of earth.

Two methods of excavation and transportation to the screening plant are used. One area of the pit, due to the terrain and geological composition, is excavated with one of two $\frac{1}{2}$ -cu. yd. Osgood shovels, purchased from U. S. Army surplus stocks. The other shovel is used for stripping. The excavating shovel dumps to a surge bin which feeds a conveyor belt loader inclining up to a screen mounted over a track. Carts, each with a capacity of $\frac{1}{2}$ -cu. yd., loaded from a hopper below the screen, are pushed along the narrow gage track to the cable lift where the contents are dumped into bucket type cars at the foot of a steep track and then raised into the plant by a cable and dumped as they reach the bin at the top. The cable lift has two cars running on parallel tracks, balancing each other on the upward and downward trips. These cars are controlled from a switch in the pit. These cars may also be dumped part way up directly into one of the lower storage bins for loading directly into trucks for direct sale without screening. The cars holding screened sand may also be pulled up and out of the pit with a cable and placed in silos in the old part of the pit.

For working the farther stretches of the pit, a slackline cableway system is employed which operates from the top of a 75-ft. tower on a cable

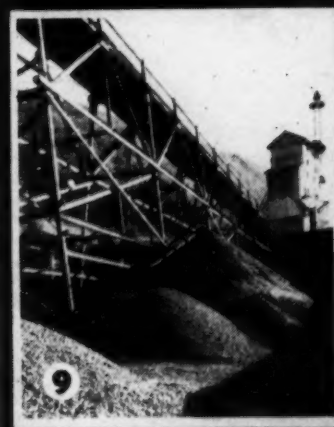
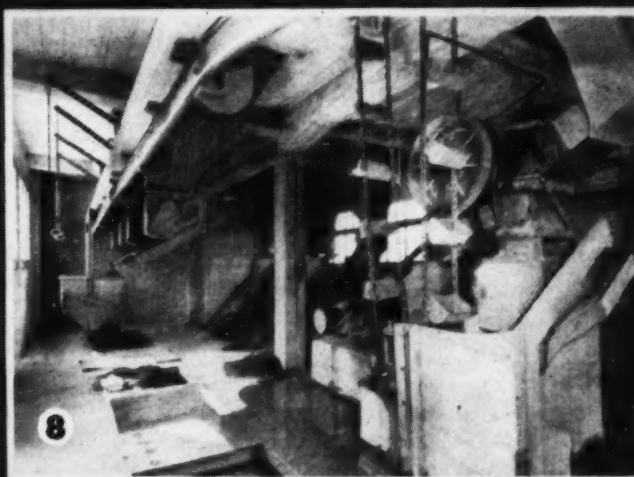
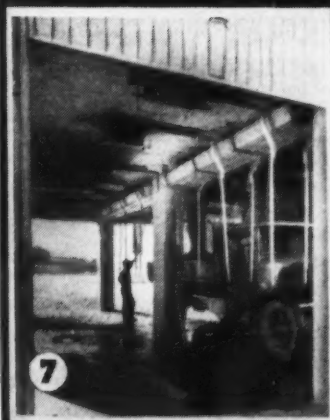
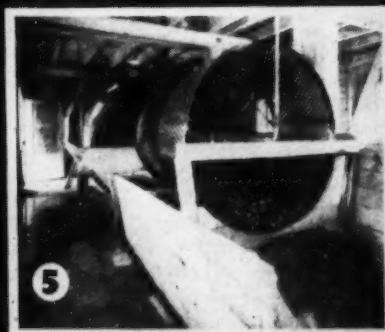
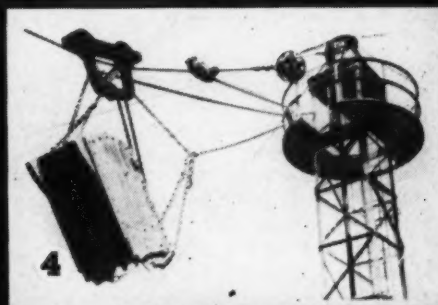
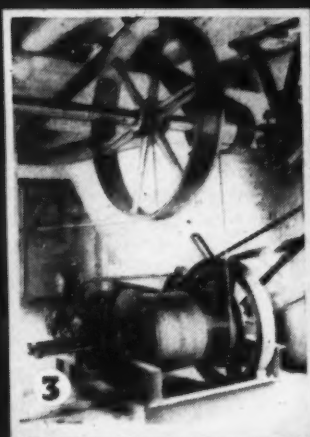
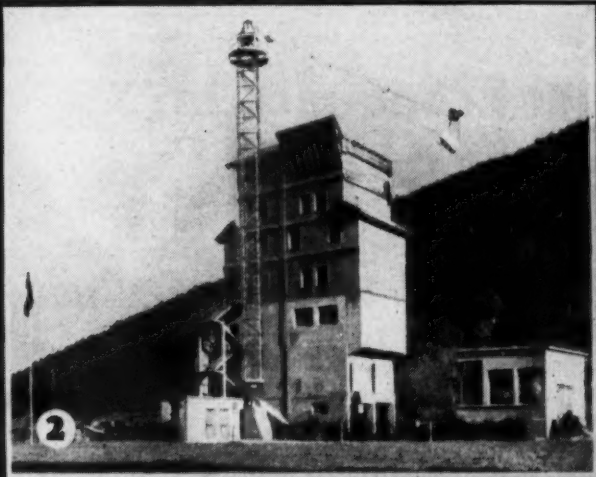
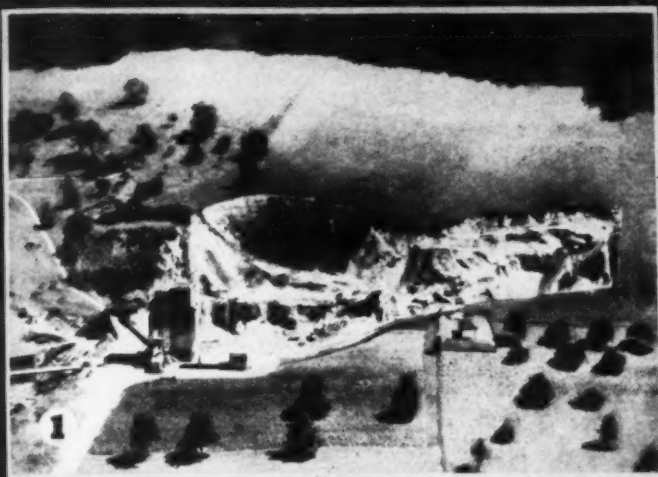
anchored at the other end of the pit. The tower itself may be revolved when necessary.

Oversize from the double-deck screen is dumped into other cars which are pushed by hand to the cable lift to be elevated into the screening plant. The plant has an output of 300 cu. meters in a 10-hr. day.

In the screening plant there are two surge bins, one supplied by the slack-line cableway system and the other by the cable lift. Reciprocating feeders at the bottom of each of these bins feed material over a large double-deck vibrating screen which scalps out the sand and gravel (0 to 45 m.m.) for final screening with the oversize going into other bins. A small hammer mill located below the level of the final screening station is fed from from the first screening station, the crusher throughs being returned to first screen for re-screening. Both wet and dry screening is used with separate bins for each flow of material. However, the wet screening method is being used almost exclusively.

The washing equipment, which received its feed from the preliminary screening section, comprises a large rotating screen using the under-water system of washing. The machine is about 4 ft. in diameter and about 21 ft. long, and is driven by a 24 hp. electric motor. This under-water or washing section of the machine is about 12 ft. long, and at its lower end allows the sand to pass down into an intermediate bin. The remainder of the washing machine consists of two rotary screens, rotating with the machine, and separating out three sizes.

Sand and gravel from the final screening state is collected in small intermediate bins on the floor above the main storage bins. This arrangement provides space for a traveling bucket suspended from an overhead track and pushed by hand to provide a number of sizes for proportioning mixes to be used in batching concrete.



Views of interesting Swiss sand and gravel plant. Fig. 1: Aerial view of plant and pit. Slackline cableway operates in the pit, to the right, and shovel excavates in pit, center, dumping material to scalping screen over bin where cars are moved over track to skip inclining up to top of plant. Fig. 2: General view of screening and storage building, showing slackline cableway bucket approaching receiving bin from pit. Fig. 3: Drum and cable winch system of the lift or skip that brings two carts of pit material up into the plant, one balanced against the other. Fig. 4: Bucket at the top of the slackline cableway tower being emptied over storage bin in screening plant. Fig. 5: Discharge end of the wet-wash screen. Fig. 6: View from pit along the cable of the slackline bucket system, looking up to the screening plant. Fig. 7: Truck driveway under storage bins. Note numerous levers to operate bin gates. Fig. 8: At this point screened material may pass directly into the silo below or mixtures of sand and gravel can be proportioned by traveling bucket, to the left, and carried to any of these special bins for concrete batching. A small hammer mill is shown in the foreground. Fig. 9: View from old pit to screening plant, showing open storage of excess products which are transported from plant by an electric self-propelled truck operating over trestle

Fuel Economies In

Firing Lime Kilns

Part 2: This article deals with the subject of lime kilns utilizing the principle of feeding fuel directly with the stone. Such kilns are used more extensively in Europe than in this country

IN THE FIELD of lime burning the mixed feed kiln along with the vertical gas-fired and the rotary kiln is a very important apparatus.

In some respects it fits certain operations better than either of the other two. It can be more efficient, thus giving a gas strength higher than the gas fired or particularly the rotary kiln. For this reason, industries which use the gas as well as the lime (such as the alkali plants manufacturing soda ash, sugar refining plants, basic magnesia plants) rely almost entirely on mixed feed kilns.

In many countries such kilns are also used for general lime manufacture, some being extremely crude. However, even in the most modern type the development has been concerned more with the charging and drawing apparatus rather than the kiln itself. Almost without exception, the kiln design has been maintained as a simple round shaft ordinarily tapered downward but occasionally straight.

As these kilns are used principally by the chemical industries that require lime of specific quality, it would seem that considerable development and design changes would have taken place, but little improvement has occurred. As a result, most operators of mixed feed kilns just struggle along with the sort of lime the kiln happens to make with little or no chance for any sort of control. Thus, the basic magnesia industry may obtain lime which is too hard burned, greatly hampering its manufacturing process. Steel plants that use lime for refractory purposes may obtain it too soft burned. In both cases it is of a non-uniform burn. For many of the other chemical processes, lime obtained is too hard burned, largely caused by the extraneous matter combining with the calcium, lowering the availability and retarding reactivity.

The reasons for this condition are the lack of arrangement for calcination temperature control, improper fuel distribution and improper flow of materials through the kiln.

Low volatile coal is occasionally used, but it is a wasteful fuel. Char-

By VICTOR J. AZBE*

coal may be used but coke is ordinarily the fuel and is generally charged alternately with charges of stone. It would be far better if the fuel were intimately disseminated forming a uniform mixture with the stone. Mixing is conducive to more uniform temperatures, resulting in lower loss due to incomplete combustion, therefore higher efficiency, less clinkering and wall adhesion, less wear of the kiln walls and less hanging. But a practical system of intimate mixing that would thoroughly mix and avoid segregation later was not available. Even if mixing was accomplished, in the wide and open spaces of the older types of kilns, the heavy large stone and the light and smaller coke would tend to segregate.

Although mixing is preferable, better than imperfect mixing is the charging in layers, but that also is invariably imperfect. This is plainly revealed by the fact that on virtually all mixed feed kilns the gas coming up in one section may be high in CO and in another, free of CO, but with considerable oxygen present. No mechanical charging today is entirely satisfactory, certainly no bell charging system is perfect as a greater part of the charge may be thrown this way or that and even hand charging is invariably faulty.

From the charging point down to the draw outlet, the kiln has always been designed as a round shaft, some have small observation openings but that is all. If adhesions occur or the charge hangs, nothing much can be done about it as there are no provisions for access and if there were, since the shaft is round, proper wall trimming and cleaning is impossible anyway.

Adhesions are likely to occur because exceptionally high temperatures are generally prevalent. With highly preheated air enveloping very hot coke, and surrounding masses of calcined lime, having little heat absorption power, excessive temperatures are the rule except when lime is drawn with core.

Thorough mixing of the charge would have resulted in a heat generating piece of coke being surrounded by heat absorbing pieces of limestone. Recirculation should have helped but never was practiced. Occasionally there was secondary admission of air to the periphery of the kiln but that was all.

Proper drawing, that is, the proper down flow of the mass through the kiln is important for controlled operation. In this respect, there have been innumerable devices, but again there was little certainty that the down flow was uniform and that the same amount of lime was drawn from one kiln as another. There never were any provisions incorporated which would allow relative sectional flow estimates and variation controls.

Improved

Many mixed feed kilns are unduly large, making proper charging and drawing only more difficult. By proper application of induced draft and forced draft giving a combination resulting in balanced draft, smaller but still rather large capacity kilns which could be far more readily controlled became possible. Also, existing kilns are suitable only for large stone. With the mastering of the charging and drawing problems, temperature control, proper draft application and, with certain other features of the Azbe mixed feed kiln such as two point gas offtake, small stone burning becomes as practicable as the burning of large stone. This may be accomplished alternately in the same kiln without engineering design revisions.

Other possibilities are offered such as calcination with a combination of fuels, as primarily mixed feed, supplemented with some gas, regular producer gas, natural gas or even blast furnace gas, if the arrangement is suitable.

With such a mixed feed kiln it is possible to produce high calcium lime very soft burned and of high reactivity or burn it to a higher density. Dolomite can be burned either soft for rapid and more complete calcination or dead if that is desirable.

The illustration shows the various features of this kiln. Some of these

*Azbe Corporation, St. Louis, Mo.

are patented while in the case of others international patents are being applied for and the rights to the system are reserved for the Azbe Corporation.

The kiln is round and only of 12 ft. diameter. Net height from the stone charging point (1) to the lime draw point (2) Fig. A, is only 31 ft. The shaft tapers slightly and in the main is square, (3) Section C-C, with slightly rounded corners, but otherwise it has straight walls. Through this design a rather large (60 sq. ft.) cross-sectional shaft area is obtained in the lower part of the calcining zone (4) Fig. A. The total volumetric capacity of the kiln is 1400 cu. ft., thus although the kiln may be rather small externally, it is large internally, and therefore of large capacity when operated with high draft, created mechanically.

The exact capacity of such a kiln would be dependent on many factors and conditions. The nature of the lime and its friability and whether it is high calcium lime, or hydraulic variety, dolomitic or magnesite would partially control capacity. It also depends on whether the stone is to be burned to soft burned lime or dead burned clinker, or whether large or small

stone is used and what draft is maintained. Capacity under certain of these conditions may be only 20 tons, under other conditions it would be 80, and to assume a 35- to 40-ton normal production is conservative. At this rate the time of passage of hard burned dolomite through the kiln would be about 36 hours.

This rate under favorable conditions could be lowered, increasing the capacity, particularly if the stone size could be reduced from the normal of 3- x 6-in.

Over-all height of the installation from the floor level to the top of the skip tippie is 70 ft. The kiln base is of structural steel rather than reinforced concrete, affording a much greater operating freedom on the draw floor.

Charging is by skip hoist (5) from the storage piles, to the stone and coke charging bins (6) located on the kiln top. The same skip bucket is used for both materials (7). The tops of the charging bins are closed to reduce air leakage. Bins are proportioned in size so the downward flow of stone and coke is about the same for a 6 to 1 lime fuel ratio.

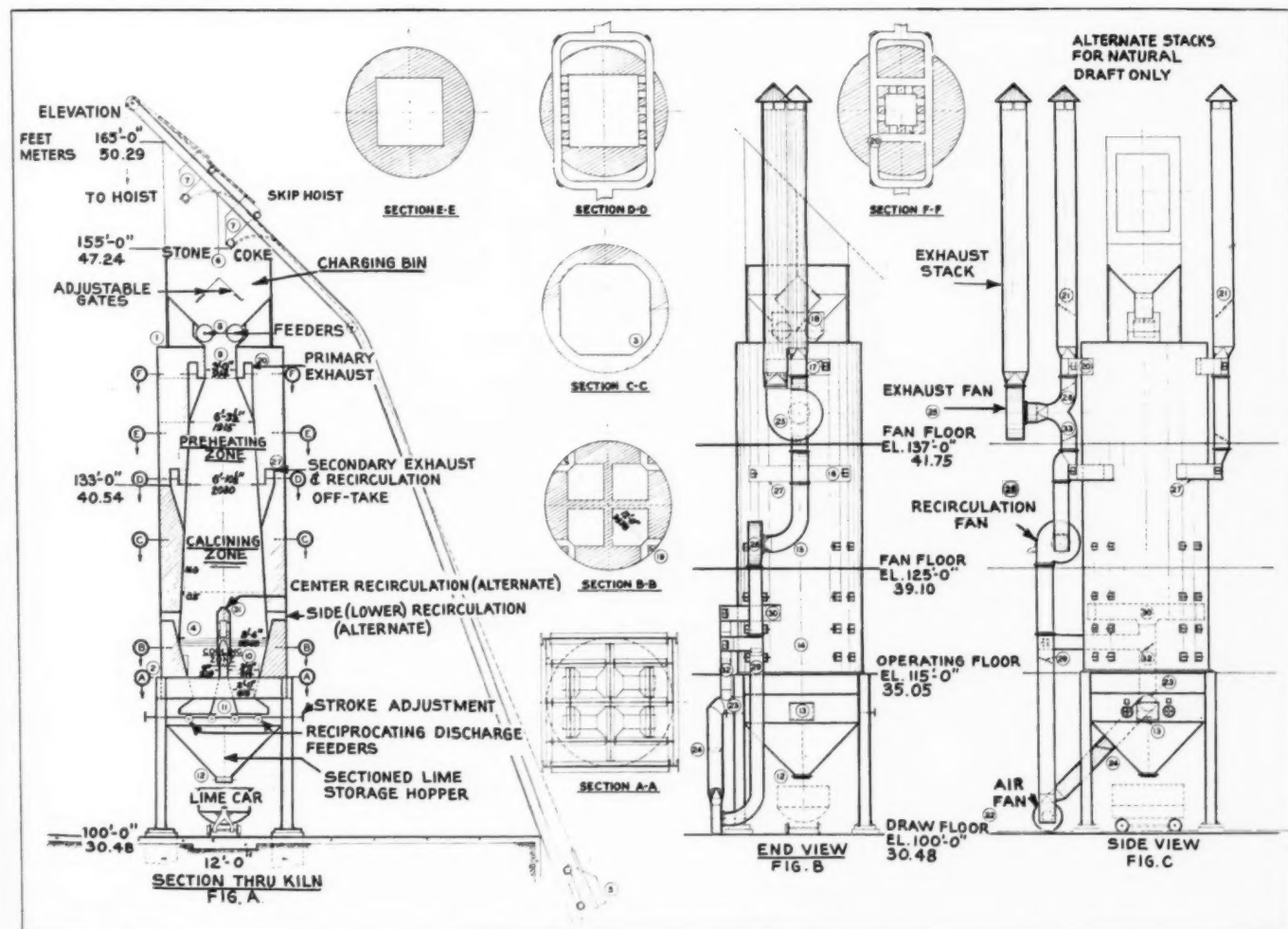
At the base of the charging bins there are adjustable control gates, but these are well open so there is little

obstruction to normal flow. The material rests freely on the feeders (8), which are synchronized with each other to control the mix; one supplying the coke, the other the stone, into a downward falling stream, simultaneously.

To avoid segregation the distance of the fall and the cross-sectional area of the heap onto which the material falls is kept at a minimum. The narrow storage section (9) is only 3 ft. square, and is never supposed to be empty, or ever more than full. For this there are automatic control provisions. While the charge is intermittent, it is so frequent that the height of the charge varies only within this limited space which at 35 tons embraces only about 30 minutes' storage.

A satisfactory mixture of stone and coke enters the kiln in a confined manner and is forced to remain confined, not being allowed to enter open spaces where it may tend to segregate. Obviously, segregation would produce a volume of stone which would be void of coke or vice versa resulting in hot and cold spots during the flow downward, giving rise to unequal lime burning.

The charge passes progressively



Elevation and plan details of mixed feed, vertical lime kiln

through the preheating zone and calcining zone to the cooler (10) and so on to the reciprocating discharge feeders (11). Internally, the kiln is open except in the lower portion of the cooler, section B-B, where it is divided into four quarters, separating the down flowing mass into four streams and thence to four separate and separately controlled discharge feeders.

The draw system makes it possible to draw either increased or reduced amounts from any quarter section if one section of the kiln works differently from another, but normally all feeders would discharge at the same rate. However, there is always the question, "Do all feeders discharge at the same rate?" It is seldom that feeders handling larger sizes of materials have the desired uniformity. To help control this situation a lime storage hopper is incorporated into the system, and this hopper is sectioned into quarters so each feeder discharges into its own compartment. Through this arrangement the operator can observe whether one feeder lags behind the other which would permit him to adjust the length of the feeder stroke to give the uniform sectional discharge desired.

The draw hopper is part of the kiln and with the kiln under forced draft it is under pressure. Lime is drawn into the lime car intermittently through the gate (12) which normally is closed. Instead of the car there may be a conveyor, or a large storage pit with a conveyor under it or other optional arrangements.

The kiln is equipped with access doors at frequent points; more than necessary, but it is better to provide for contingencies than to wish that one had.

Doors, (13), in addition to providing access to the feeders, allow the operator to observe the amount of lime discharged by any feeder into its respective draw hopper compartment.

At (14) the kiln operator would break up the fused masses in the event that these have formed and at (15) he would trim them free from the walls in case of adhesions.

The poke hole system at (14) and (15) is of special kind and is shown more clearly in (19), section B-B. There are twin doors to each internal corner in this arrangement, affording complete access and observation for straight bar poking of any kiln section. Thus, in the case of a hang, the walls can be seen and their condition gauged accordingly.

Normally, this door system may not be necessary in its entirety but when dead burning dolomite to a high specific gravity, fusion and adhesions do occur. Even in such operation, however, it is less likely with this kiln design, due to continuous flow through the kiln and continuous rearrangement and adjustments of the particles

which tend to prevent them from fusing to each other.

Access doors, (16) and (17), are provided for the gas duct and (18) the feeders charging the kiln.

Draft Systems

The fan systems are shown in Figs. B and C, but more plainly in the latter. There are three fans, but break down of any one, or for that matter all of them, would not shut down the kiln as natural draft operation would then still be possible.

In case of natural draft operation, air would enter the kiln through the doors (13) at the lime discharge feeders and the gases would pass to waste through ducts (20) of Fig. A and section F-F to the stacks (21) of Fig. C. Control would be with dampers shown at (21).

In the case of forced draft operation, the air fan (22) would deliver air to the lime draw chamber at (23), putting it and the entire kiln under pressure. Similarly to natural draft operation the gases would escape through stacks (21) of Fig. C. In this case, however, control would be by damper in the air duct at (24).

For induced draft operation, the draft system would be similar to natural draft operation except that the gases leaving the kiln through ducts (20) would pass to the exhaust fan (25) instead of passing to the stacks (21). Control in this case would be by damper (26).

In the event that balanced draft would be desired, both air fan (22) and exhaust fan (25) would be synchronized in a manner so that in the hot zone of the kiln there would be neither pressure nor suction but still a high gas flow.

Temperature Control

Temperatures are more uniform and less likely to be excessive when there is truly mixed feeding of coke and stone. Nevertheless, provisions for temperature control are desirable. This can be accomplished satisfactorily only through the recirculation of gases. The patented Azbe system of recirculation incorporated in this design tends to withdraw the gases from immediately above the dissociation zone and reintroduce them in the hottest section of the kiln. Recirculation therefore occurs from one end of the calcining zone to the other, between that which is cool to that which is too hot. No over-cooled gases are returned to the system except in the degree that they may have cooled while passing through the connecting ducts.

The recirculation connection is shown at (27) of Figs. A, B, C, and section D-D. The recirculating fan, (28) of Figs. B and C is a fan which should be capable of operating at high heat, no lower than 1000 deg. F., and in some cases it would be desirable to have a fan with a heat resisting alloy

wheel for still higher temperatures.

Recirculating gases may be reintroduced in several ways, as for example in a small degree with the air, in which case duct and damper (29) would be used. This would be the simplest, but may be permissible with only dead burned dolomite. If recirculating gases were reintroduced in this manner to soft burned lime the tendency would be towards slight recarbonation in the cooler.

The second system of reintroduction would be through the side duct (30) immediately above the cooler.

The third alternate is to introduce the recirculating gas alone, or combined with secondary air into a hollow (duct) center pier (31) Fig. A. This duct is similar to the center burner and extends across the kiln shaft. The center duct could also be used for the introduction of other gases, as for example those from the blast furnace or gas producer.

If the recirculating gases were too hot for the fan (28) they could be tempered by admitting some exhaust gases from the exhaust manifold (26). The system then becomes truly universal. Either hot or ordinary exhaust gases can be recirculated to the suction of the air fan or to the hot zone and reintroduced to the kiln through the kiln sides or center of the shaft. Parts of this same system could also be used for the introduction of some secondary air, for which a duct (32) Figs. B and C is installed.

Burning of Small Stone

When calcination of small stone is desirable, such as 1½ x 3-in. as contrasted to 3 x 6-in. for large stone, the necessary kiln height becomes considerably less. If the kiln height were not reduced, the draft necessary would become excessive. Higher capacities would at first appear possible with small stone due to the very much larger surface area it presents, actually, however, due to draft limitations, a much lower capacity would be obtained. As there is no thermal gain in dragging the gases through excessive height, then, height and resistance should be reduced for the gain in capacity. Ordinarily, separate kilns would be necessary for this, a set for large stone and another for small stone.

The apparently intricate but actually entirely practicable gas circuit explained above makes possible alternate burning of large or small stone. Exhaust fan (25) would continue to operate in the usual manner, but instead of obtaining gases from (20) Fig. A, section F-F, and Fig. C through (26), gases would be obtained from the recirculating ducts (27) through the connection (33) Fig. C. The normal preheating zone then would become an additional storage zone and part of the calcining zone would then be used for preheating.

This change would shorten the kiln height one third which is not quite enough if the stone size is halved. The equivalent of a further shortening could be accomplished by admitting only part of the combustion air at the base of the cooler and the balance as secondary air through the side and center inlets of the recirculating gas intake.

Summary

Operating requirements are low, as supervising attention is needed only at the kiln proper, and one man could attend to several kilns if the removal of lime is by conveyor and the stone and coke charging is considered a separate operation.

Capacity of the kiln is high as there is ample heat absorbing surface and sufficient fully controlled draft. Efficiency is also high for several reasons. Kiln spaces are adequate, and with normal size stone there is sufficient surface area for low temperature differential at the end of the respective zones. Complete mixing of fuel and stone results in lower incomplete combustion loss and in more uniform gas distribution passing up through the various sections of the bed. The cooler is adequate and air divides and enters for full preheating by the lime passing out. Both the stone and fuel are preheated with waste heat, and the radiation loss is low due to the small external area and high capacity at which the units may be operated.

There is an additional important item which so far has not been commented upon. By virtue of the fact that the kiln is almost always full, that there are no deep drops, and it is drawn in small amounts continuously, fragile material may be calcined and fragile fuels such as charcoal may be used. This is aided further by the features which are incorporated to aid uniform solid and gaseous flow and by the mechanical draw system which tends to rearrange the masses and expose obstructed surfaces to heat.

Such abraded material as may occur is also passed through the kiln at a greater rate of speed thus reducing its tendency to interfere with proper gas flow distribution.

EDITOR'S NOTE: Next article in the series will cover oil-fired kilns.

Belt Conveyor Handbook

THE JEFFREY MANUFACTURING CO. has recently issued a new book of formulas and designs for belt conveyor installations which is worthy of a place on the book shelf of all rock products operators (Catalog 785, 7½ x 10½ in., 160 pp.). It is designed to help the operator select a belt conveyor by means of tables and simple formulas by the shortest possible methods. It is particularly interesting at this time because it contains list prices of all standard parts, which shows that as recently as last Summer this manufacturer considered conditions sufficiently stabilized to venture publishing price lists. Since then some manufacturers of machinery used in the rock products industry have returned to a "price at time of delivery" basis. We find no references to the prices quoted in this handbook, and it is possible that price changes are provided for by varying the discount rates.

The "Foreword" of this catalog states that "many conveyor problems can be answered by using a standard conveyor and this handbook provides a complete selection of standardized units, which have been so indexed and classified that by referring to the proper tables it is easy to determine the correct conveyor for a given need, and then to order the complete conveyor by its number." It is also suggested that these standard designs can be useful for checking purposes where the operator is designing a conveyor for any particular purpose.

In addition this handbook lists a complete line of anti-friction idlers, cast iron and steel, and all the other necessary equipment usually required

with belt-conveyor installations, such as belting, trippers, take-ups and power-transmission machinery. For example, the tables include standard gear sizes and directions for selecting the proper size gears, which should prove helpful in other kinds of gear applications as well as in belt conveyor drives.

Feeders for belt conveyors are treated in some detail. This is a matter of much importance that is receiving more attention in new designs than was given to the problem in many of the older plants. All types of feeders and their special applications are described. Included are a brief description, graph and tables for designing feed hoppers.

Sheave and Drum Sizes For Wire Rope

SHEAVE AND DRUM SIZES for various wire rope applications was the topic of a feature article in a recent issue of *Rope-Ology*, published by the Mac-Whyte Co., Kenosha, Wis. According to the company, this is the subject most often brought up to the wire rope manufacturer.

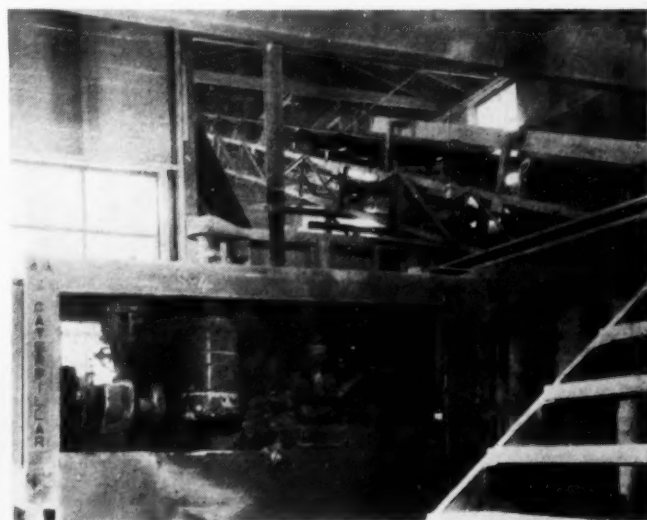
It is generally recognized, the article said, that the larger the sheave or drum the longer will be the rope life. However, the size cannot be determined without considering the effect on the machine as a whole.

Usual sizes on various wire rope applications are as follows:

Equipment	Sheave and Drum Size
Portable Excavating Equipment	16 to 36 times rope dia.
Overhead Electric Traveling Cranes	30 to 40 times rope dia.
Mine Hoists, Incline Slope	48 to 80 times rope dia.
Mine Hoist, Vertical Shaft	64 to 110 times rope dia.

Explosion at Quarry

GROVER HERTZOG, owner of the Hertzog quarry, Trenton, Mo., recently had his home damaged to the extent of \$5000 by an explosion of 250 lbs. of dynamite and five cans of powder which were to have been used for blasting purposes in the quarry.



Maumee Stone Co., Maumee, Ohio, produces a complete line of limestone products, from large diameter hot-mix rock to pulverized limestone for concrete block plant use. An Austin-Western 21- x 38-in. primary crusher, a 10- x 40-in. secondary crusher and a No. 4 Universal hammermill are all powered by two Caterpillar Diesel D13000 engines. A third D13000 Diesel engine provides power for a Marion shovel in the quarry

New Markets For Lime

National Lime Association convention at Hot Springs, Va., hears reports on lime-soil stabilization, legislation, instrument control, and research

THE 30th annual convention of the National Lime Association, held April 5-7, at The Homestead, Hot Springs, Va., was well attended and excellently arranged for a full program with maximum participation in the outdoor activities for which the hotel is famous. Each of the three days had a full morning program for the transaction of business affairs of the Association and presentation of extremely interesting papers on a wide variety of timely subjects, leaving the afternoons open for golf or other sports and for informal exchange of ideas for those who preferred to talk shop.

H. D. BRIGSTOCKE, chairman of the board of directors, presided over the opening session. In calling the convention to order, he commented very briefly on the possibility of reimposition of government controls in the coming year but expressed confidence that the industry will surmount these obstacles successfully as it has in the past. Then followed reading of the financial report, the appointment of committees and reports on the election of directors and Association activities. The Association is in excellent financial position and has completed a year of many accomplishments. An ambitious program has been charted for the coming year.

Immediately following these presentations, WALLACE E. WING, Marblehead Lime Co., Chicago, took the chair

to preside over the general session which had two excellent papers for technical and operating men, a discussion of current legislation and court decisions, and a talk on European and world conditions in the immediate future ahead.

The second morning's meetings opened, under the chairmanship of Mr. Brigstocke, with a consideration of the budget for the fiscal year 1948-49, followed by reports of committees, announcement of winners of the 1947 National Lime Association Safety Competition and ratification of officers. RUSSELL RAREY, The Marble Cliff Quarries Co., Columbus, Ohio, was chairman of the trade waste-construction session immediately following. PROF. WALTER C. VOSS, Massachusetts Institute of Technology, presided over the final session which was devoted to research.

To round out a well-diversified program, the traditional Bingo party was held one evening, with prizes awarded to the winning ladies by Mr. and Mrs. Burton A. Ford, St. Regis Paper Co. The reception and annual banquet were held the second night.

Officers

H. D. BRIGSTOCKE, Thomasville Stone and Lime Co., Thomasville, Penn., was reelected president and chairman of the board of directors for the fiscal year 1948-49. Also reelected



Bob Boynton, general manager, National Lime Association, smiles for the camera

were Robert S. Boynton, general manager and treasurer; Mrs. Roma M. Turpen, secretary; and Miss Gladys McBee, assistant secretary.

Elected to the board of directors were C. C. Loomis, New England Lime Co., District 1; H. D. Brigstocke, E. D. Williams of H. E. Millard Lime and Stone Co., and B. L. Corson, G. & W. H. Corson, Inc., District 2; A. B. Miner, National Gypsum Co., F. J. Collins, The Kelley Island Lime and Transport Co., and R. C. Bye, Warner Co., District 3; John J. McGinnis, Eagle Rock Lime Co., District 4; Fred Witmer, Ohio Hydrate and Supply Co., and W. W. Sprague, National Mortar and Supply Co., District 5A; Russell Rarey, The Marble Cliff Quarries Co., District 5B; L. M. Carmouche, The Dow Chemical Co., District 6; W. E. Wing, Marblehead Lime Co., District 7; M. Brisch, Jr., Rockwell Lime Co., District 8; Henry LaLiberte, Cutler-Magner Co., District 9; K. L. Hammond, Keystone Lime Works, Inc., Districts 10 and 11; Paul Sunderland, Ash Grove Lime and Portland Cement Co., District 12; G. E. Robinson, Austin White Lime Co., District 13; P. H. McMillan, Roche Harbor Lime and Cement Co., District 14; and Kennedy Ellsworth, United States Lime Products Corp., District 15. Messrs. Brigstocke, Hammond, Wing, Corson, Miner, Bye and J. A. Dunaway, Peery Lime Co., Inc., (newly elected) comprise the executive committee.

General Manager's Report

ROBERT S. BOYNTON, general manager, in his annual report, summarized activities of a very busy past year and outlined a program for the year ahead that indicates an intensi-



Technical Committee met at luncheon. Left to right, standing: J. S. Offutt, D. D. Crandell, Prof. W. C. Voss, L. J. Minnick, C. C. Loomis, J. A. Murray. Seated, left to right: Robert S. Boynton and Wallace E. Wing

fied effort is underway to promote the uses and acceptability of lime.

One of the major efforts being undertaken is the industry's case for securing percentage depletion. Mr. Boynton cited the cases where the government has been giving depletion allowances to other industries, to be used against tax returns in varying amounts. In his opinion, the industry has a legitimate case for securing allowances on the basis of discrimination, and the industry's case is being specifically built around chemical and metallurgical uses of lime. A statement has been prepared requesting that the House Ways and Means Committee include lime as a product qualified to secure depletion allowance. An amendment to the Federal revenue code will be required for acceptance.

Several of the Association's booklets have been revised and reprinted the past year and a new one, "Lime Hints for the Home," has been printed. Several new bulletins are scheduled for publication in the year ahead. One is a technical publication for consumers of lime, that will cover handling, storage, etc., of lime. A second consists of a series of technical bulletins on trade wastes of which the first will be titled "Use of Lime in Industrial Trade Waste Treatment." Another will be a cost study of the use of lime compared to soda ash and caustic sodas while still another will consider all the possible uses of lime in an ideal installation. The purpose of these publications will be to make users and potential users more lime conscious.

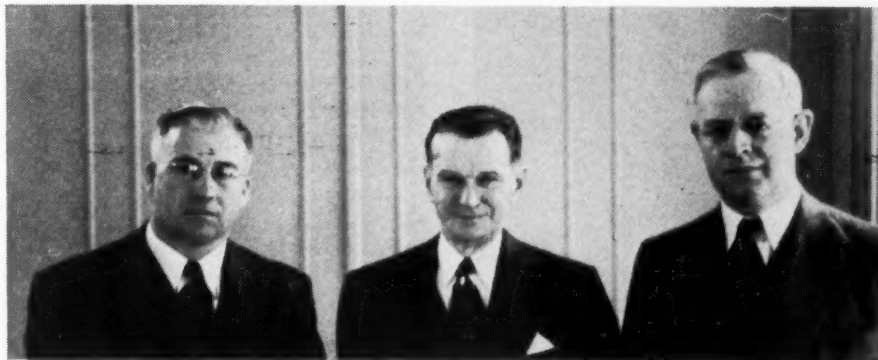
Mr. Boynton reported on a trip to Texas in connection with the lime-soil stabilization program in that state, and was very enthusiastic over the possibilities of extending the use of lime for that purpose. The A.R.B.A., he said, has a committee set up for study into lime-soil stabilization and the Association has a research program started at Purdue University to consider various tests and to develop test bases for field use.

Commenting on research in general, he said that the Association's program is making progress and has been increased. The over-all program is basic in nature. Publicity articles have been developed on the use of burned lime for soil application, for trade wastes and in other applications.

Mr. Boynton reported that great interest is being shown by production men and engineers in the operating sessions. The annual wage rate survey has been increased in scope with ten new job classifications. He concluded with an expression of great appreciation for the help and cooperation he has been receiving from the officers and membership.

Resolutions

Resolutions were unanimously approved that expressions of sympathy as recorded in the minutes of the



Three active participants on program. Left to right: Dr. Garth W. Volk, Ohio State University; and Prof. W. C. Voss and J. A. Murray of Massachusetts Institute of Technology

meeting be conveyed to the families and associates of four members who passed away since the last convention. These members were D. E. Washburn, Warner Co., Bellefonte, Penn.; H. Dettlinger, Dettlinger Lime Co., New Braunfels, Texas; George Brewer, Longview-Saginaw Lime Works, Inc., Birmingham, Ala.; and Harold Williams, Williams Lime Manufacturing Co., Knoxville, Tenn. M. Brisch, Jr., was chairman of the resolutions committee.

Safety Competition

W. HARVEY, JR., National Lime Association, announced the winners of the 1947 National Lime Association safety competition, which is based on Bureau of Mines figures. The York, Penn., plant of National Gypsum Co. and the Thomasville, Penn., plant of Thomasville Stone and Lime Co. had perfect records in the classification for plants with quarrying and calcining facilities operating 100,000 man-hours or more. In the classification for less than 100,000 man-hours, the Thomaston, Maine, plant of Lawrence Portland Cement Co. and the Linville, Va., plant of Southern Lime and Stone Works were winners.

National Gypsum Co.'s Bellefonte, Penn., operation had the lowest severity rate in the large plant classification for underground mining with calcination operations. Its severity rate was 0.168 for 362,869 man-hours worked. Nyotex Chemicals, Inc., Houston, Texas, with a severity rate of 0.295, had the best record for plants calcining lime but having no quarry.

Man-hours operated by the industry increased in 1947 over 1946 and the frequency rate was 31.062 as compared to 34.203 in 1946. However, the severity rate was higher, with four reported fatalities. Forty-two companies were entered in the competition.

Legislation

ABRAM F. MYERS, counsel, Washington, D. C., in his talk, "Current Legislation and Court Decisions," largely commented on the more significant provisions in the Taft-Hartley Act. He traced legislation on labor previous to enactment of this Act which led to conditions in labor rela-

tions that in his opinion were un-American. The Clayton Act of 1914 started the trouble when it took unions out of the Anti-trust Act, which was originally intended to prevail for all classes. The last control over labor ended, he said, with enactment of the Norris-LaGuardia Act and he classified the Wagner Act as a flagrant piece of legislation that was entirely partisan.

Mr. Myers considers the Taft-Hart-

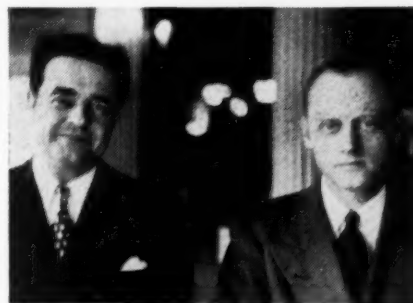


Prof. W. C. Voss, left, and L. J. Minnick

ley Act as extremely significant because it represents a sharp break in the trend that labor legislation had taken the past 16 years. He was surprised that so liberal a law was enacted.

European and World Conditions

WALTER J. MURPHY, editor of *Industrial and Engineering Chemistry*, Washington, D. C., who has spent



Two of the speakers on soil stabilization. Chester McDowell, left, of Texas Highway Department, who spoke on lime-soil stabilization and A. W. Johnson, Highway Research Board



Prof. W. C. Voss

considerable time in Europe before and after V-E day and who was an observer at Bikini in 1946, summarized conditions particularly in the European countries. His talk was entitled "An Editor Looks at Europe and the World in the Atomic Age."

Britain is hopeful for improved conditions, he said, but has some serious problems in need of solution before the nation can return to normal functioning. The people realize that the empire has undergone disintegration the past 25 years. A serious problem is over-population with simultaneous shortage of factory workers. Manufacturing equipment had been greatly overworked for six years, without replacement, and as a result manufacturing is a high cost process. The British, according to his observation, are opposed to adoption of labor-saving ideas.

Industry was hard hit in France and extremely so in Italy where a great number of bridges and other structures were knocked out during the war. Black markets flourish in both countries and there is general lack of confidence by the people in their currency. Belgium is prospering, Switzerland is in good shape and Holland is doing a good job in trying to recover. The Scandinavian countries are coming back well, but all are in fear of communism.

As far as Germany is concerned, Mr. Murphy said destruction was terrific and that that country needs help badly from the outside. It is his opinion that the United States must be represented in Germany for two generations in order that the growing children be grounded in democratic principles. The most encouraging observation was that the German people want help only temporarily. As far as the European Recovery Program (E.R.P.) is concerned, he believes the most important thing to be the selection of administrators who are good statesmen and who will take advantage of aid from qualified businessmen. In order to restore German industry, aid is needed and particularly the services of technical personnel.

In an age where atomic bombs and bacteria are potential weapons, Mr. Murphy believes this country should take a forward, intelligent attitude and make it plain that we are striving for a United States of Europe.

Instrument Control of Operation

In his introduction to a very detailed discussion of instrumentation at the new Kimballton, Va., plant of National Gypsum Co., C. B. Cox, electrical engineer at that plant commented on the measurable factors in lime plant operation, general advantages and practical values. Instruments, he said, yield tangible and practical dividends measured in dollars and cents which can write off the original cost in a very few years and sometimes in a matter of weeks.

Some of the services rendered to industry by instrumentation were itemized as labor savings, fuel savings, increased production, improved quality of product, elimination of "rejects," uniformity of product, minimized reliance on human watchfulness and elimination of accidents.

Preliminary to detailed discussion, Mr. Cox briefly described the plant operation. Limestone is mined and, after crushing and sizing, enters preheaters to the rotary kilns, is brought up to an inlet temperature of approximately 1000 deg. F. and the calcined product is discharged at about 2000 deg. F. into rotary coolers. There are two 300-ft. rotary kilns each rated at 300 tons per day. From a shell diameter of 10 ft. they neck down to 8 ft. at the inlet end. Each kiln has a ball-type unit coal pulverizer, induced draft and forced draft (cooler) fans, stone preheater, 4-speed drive on the kilns and feeders, rotary cooler, skip hoist for conveyance to storage, and air-operated control drives for all dampers and gate feeds necessary to kiln operation. An article was published in *ROCK PRODUCTS*, December, 1947, p. 135, describing the entire operation.

Mr. Cox said that the controls for the kilns were designed to permit the operator to decide the heat requirements, after which combustion conditions are maintained automatically,

and all control is centered at the firing floor. Primary air flow was selected as the basic condition upon which all other combustion conditions with known ratio requirements are automatically controlled and, for that reason, is controlled only by remote manual operation of the damper in its supply line. Primary air could be controlled automatically through a ratio controller should any other combustion condition be selected as basic. The kiln control panel (See *ROCK PRODUCTS*, January, 1948, p. 93, for instrument diagram) has recorders, controllers, indicating gauges, ammeters, indicating lights, selector valves, push buttons and alarms. Control, other than electrical, is obtained by air pressure supplied at 28 p.s.i. to the various controllers. The loading pressure may be varied in accordance with the regulating range of the instrument, the amount being determined by the variation of the controlled factor as measured by the metering element. With changes in the controlled factor, changes are produced in loading pressure to reposition the control drive and stabilize the controlled factor at a higher or lower point.

A pitot tube at the primary air intake to the coal pulverizer measures the flow which is recorded by the instrument in lb. per hr. A resistance thermometer at the coal pulverizer measures temperature of the air leaving the mill (also recorded). A standard pointer is set at the desired temperature (150 deg. F.) and loading pressure changes are made automatically as the recording pin approaches the limiting temperature, to adjust the control drive to the tempering air damper and thereby admitting cool air. Automatic control of the secondary air flow is achieved through a primary-secondary air ratio controller. An oxygen analyzer is used for the continuous determination of the volumetric percentage of oxygen in the exit gases. Mr. Cox described operation of the analyzer in detail which space will not permit herein.

A radiation pyrometer focussed on the refractory lining in the burning zone measures the refractory temperature and it is recorded. Temperature of the gases is measured by thermocouples at the 100 and 200 ft. points and at the rock feed, and recorded, to provide the operator with information on temperature conditions within the kiln. A thermocouple at intake to the induced draft fan measures (also recorded) temperatures of the exhaust gases and a tempering air damper automatically adjusts to prevent exceeding a set, safe temperature for fan protection.

Kiln speed and feed are synchronized, kiln speed is measured by tachometer and remote manual control of all four speeds is had at the main control panel.

Constant fuel-air ratio is maintained by a ratio controller at the



D. D. Crandall, left, with Wallace E. Wing

pulverizer consisting essentially of two diaphragms which apply their operating forces on two beams separated by an adjustable fulcrum. The smaller diaphragm is actuated by the pressure differential across the pulverizer; the larger by the primary air differential. An unbalance in these forces moves a mill differential beam, automatically making loading pressure adjustments to the control drive of the fuel feeder. By a similar controller the primary air-secondary air ratio is held constant and another is used to maintain automatically a preset hood draft negative pressure.

Multipointer gauges provide the operator with a picture of the primary air differential, pulverizer differential, secondary air pressure, kiln outlet draft and hood draft, and selector valves provide a choice of either hand or automatic operation for induced draft, primary air, coal feed, secondary air and tempering air dampers.

Cost of instrumentation for both kilns approximated \$35,000, an expenditure which is considered justified because closer control results in maximum output and constant standard high quality of product. Operators with less developed skill may be employed, and accurate long-time chart records are considered a good tool for the program of the company to improve lime production methods.

In hydrating lime, the temperature of the reaction, measured in the mixture and recorded, and an ammeter on the hydrator motor are control devices. They are a means of determining the quantity of water required. Temperature drops with an excess of water and the load factor on the motor and hydrator builds up rapidly. These two devices installed represented an investment not to exceed \$250 which, said Mr. Cox, will be returned within a year through increased production alone, exclusive of benefits in quality of product.

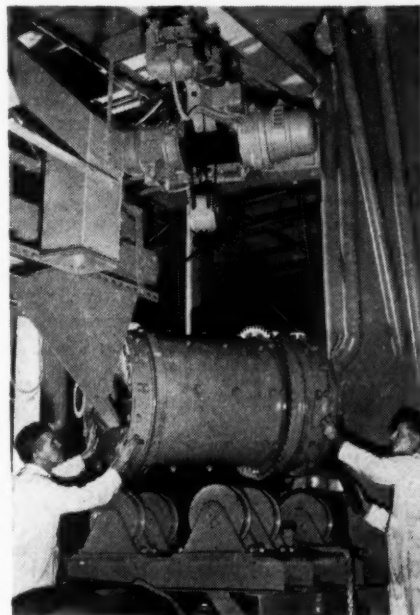
Mr. Cox emphasized strongly that an instrument is useless unless maintained in accurate working condition all the time. He recommends adoption of a preventive maintenance system of systematic cleaning, repairing and verification of calibration, and maintenance of an adequate stock of repair parts. In conclusion, he said that experience thusfar at Kimballton has indicated substantial savings are coming from instrumentation and, more important, a definite improvement in quality of product.

Basic Industries Research Laboratory

The basic industries research laboratory of Allis-Chalmers Manufacturing Co. was described in detail by W. T. Tock of the Basic Industries Department, Allis-Chalmers, who invited the membership to make a personal tour of the laboratory. Some slides were shown of various parts of the laboratory and the equipment installed.

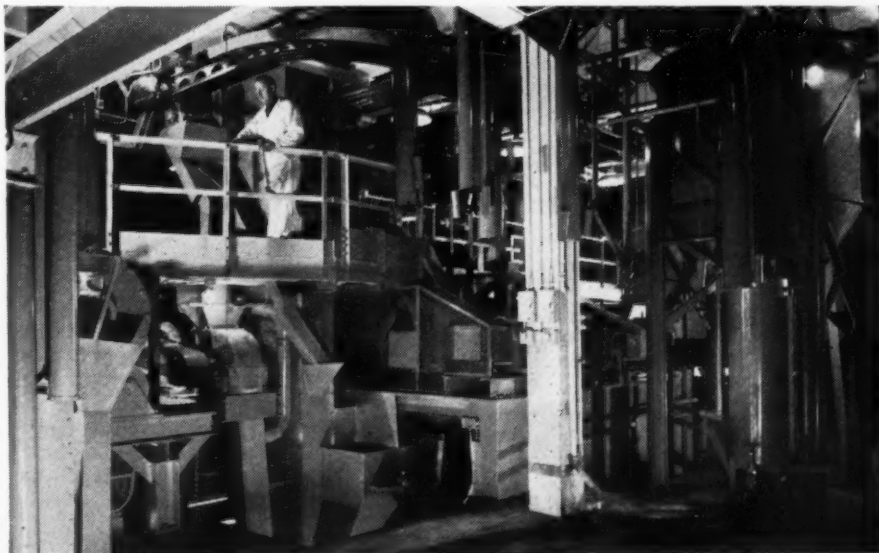
The laboratory, which was described in *ROCK PRODUCTS* at the time of official opening in 1946, was designed to perform the special test work involved in the engineering recommendations of the Basic Industries Department of the company and is located at the company's West Allis Works. It consists of four sections: crushing, cement and mining, flour milling, wood processing, and chemical and extraction. The basic raw materials tested include ores, minerals, stone, lime, portland cement and many others. Housed in a five story building, the laboratory has 25,000 sq. ft. of floor space.

Laboratory test work divides into two classifications, batch testing and continuous or pilot mill testing. Batch tests can be made on samples ranging from 25 lb. to 500 lb. which may be put through the various processes to be tested such as crushing, grinding

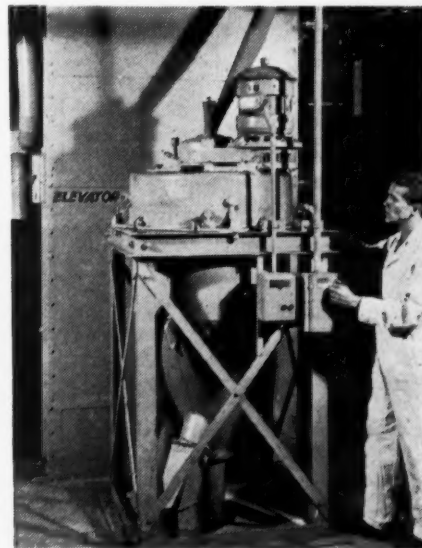


Setting up a 30- x 48-in. grinding mill in research laboratory

and, concentration or separation, in successive steps with accurate weighing and control in each step. In the pilot mill, samples from 500 lb. to ten tons or more are passed continuously through the various processes so as to simulate as closely as possible actual plant operation. The two sections together constitute a complete testing service. Closed-circuit grinding with screens or air separators, crushing through various types of equipment, screening, classification, beneficiation including flotation and heavy media separation, and almost every other conceivable process in which the rock products industries have interest may be tested with various materials. Power meters are provided so that complete capacity and power consumption data can be obtained on any material tested.



View of crushing equipment in Allis-Chalmers' laboratory



Air separator for closed-circuit grinding in laboratory research

The laboratory has recently been equipped with a 39-in. by 30-ft. rotary kiln with detachable chain drying section, which may be adjusted to various slopes and driven at any desired speed. It has air-cooled ends for elevated temperature operation and may be fired at either end by propane gas burners.

The kiln can be fed continuously, with exhaust through a stack, dust collector and scrubber by means of an exhaust fan, and temperatures may be recorded automatically as measured by seven thermocouples in the kiln.

Stream Pollution

The seriousness of the stream pollution problem and the need for a united front to combat it were emphasized by C. E. SCHWOB, Sanitary Engineering Director, U. S. Public Health Service, Washington, D. C., in a paper "Federal and State Stream Pollution Legislation." Pollution presents a problem of abatement and another to prevent its getting started.

According to a survey made a year ago, some eight billion dollars worth of work is needed on water supply, waste disposal, insect elimination, etc., one and one-quarter billion dollars for sewage treatment alone, in order to combat dysentery, typhoid and other water-borne diseases.

Public health laws and codes of local communities and sanitary districts are helpful, he said, because they provide for enforcement but the extent of powers of the various states to enforce stream pollution regulations varies. Twenty-six states have specific laws that provide partial enforcement but only eight have real control, according to Mr. Schwob.

All states should have pollution laws from which there would be no exemptions for selfish interests, he said, and there should be teamwork to include industries in order to stamp out pollution.

Interstate action is required too where streams flow through several states, in order to control drainage basins. He mentioned that Delaware, New Jersey, New York and Pennsylvania have a single authority that sets standards for water quality and sewage treatment facilities. The Ohio River Compact and the Interstate Commission for control of the Potomac river are other control organizations.

Several bills are pending in the 80th Congress that would provide financial and technical aid to industries and states, provide for cooperation between all agencies in comprehensive laws to control water for irrigation, give federal support to the formation of uniform state laws to protect industries competitively from each other, have provision for the government to help solve specific problems and authorize loans to help solve the problem.

Lime-Soil Stabilization

An extremely interesting paper from the standpoint of possible extension of markets for lime, "Lime-Soil Stabilization in Texas," was presented by CHESTER McDOWELL, Senior Soils Engineer, Texas Highway Department, Austin, Texas. Some 75 miles of stabilized base have been built using hydrated lime for stabilization in Texas and with success.

Mr. McDowell's paper covered laboratory and field experiments, outlined recommended test procedure, properties of the mixtures and methods of use. Flexible base stabilization investigations with hydrated lime started in 1945 and the first experimental sections were built in August of that year. While entirely satisfied with results, he believes that additional strength should still be obtained by the use of lime with some additional stone or gravel added to some soils.

Thusfar, "waste" lime rejects from lime hydrators, has been used, containing up to 100 per cent moisture and averaging approximately 75 per cent calcium hydrate. The soil was scarified to a depth of 6 in., air-dried, and three per cent lime was then applied and bladed in. Then followed moistening, compaction, moist-curing, dry-curing and a seal of bituminous surfacing. After 2½ years' service the original installations are still in nearly perfect condition and cores cut from the roadways have had more strength than laboratory tests would indicate.

Texas has had damage to roads from freezing and thawing but none of the treated bases have failed. Some of the damaged surfaces, after treatment with lime, have been holding up well.

Success of lime-soil stabilization, he emphasized, depends upon the properties of the soil-lime mixtures. Many soil materials contain certain pozzolanic substances, such as diatomaceous earth, bentonite, some clays and shales which are siliceous or contain silicates, which are highly reactive with hydrated lime and form stable, cementitious compounds. This is essential for sufficient strength and stability for the intended use. It was pointed out that the mixtures need not develop the strength expected of concrete.

In order to increase the use of lime for stabilization, Mr. McDowell recommended that the highway construction and engineering professions be made to know the strengths that may be attained, that research be undertaken to develop control of quality of mixtures, that field tests be developed and that a low cost product be produced for the purpose. He particularly stressed that a relatively cheap commercial lime must be made available. On this assumption, he foresaw the probable use of 100,000 tons of lime a year in Texas in the construction of 90 miles of road, which would increase

the total lime demand in Texas by 65 per cent.

A number of questions were answered by Mr. McDowell. On black gumbo soils he said that a 3 to 5 in. application of untreated gravel was placed, over it the 6-in. lime-treated course and, usually, ½ in. topping of bituminous surfacing was applied. Traffic over the lime-treated roads is in the neighborhood of 1000 vehicles daily.

As to quantity of lime applied, he said that three per cent was the average with granular soil materials where no more than 60 per cent is minus 40-mesh size. With fine materials, 5 per cent lime might be applied and even higher quantities are sometimes specified. Chemical properties and color, in a commercial product, may have to be foregone in the interest of low price, he said, and while all the lime so far used is high calcium he does not believe a dolomitic lime would be unsuitable. It was suggested by Prof. Voss that quicklime, which will react with pozzolanas much faster than hydrate, might be tried instead.

Stucco-Plastering

ERWIN M. LURIE, national director, National Foundation for Lathing and Plastering, outlined the program of his organization, which should benefit the lime industry. The title of his talk was "Bolstering Stucco, Plastering Industry." The Foundation consists of The Wood, Wire and Metal Lathers International Union, The Operative Plasterers and Cement Finishers International Association and The Contracting Plasterers International Association, two unions and an Association of users, and was started in 1945. It proposes to rebuild the stucco and plastering industry back to levels of acceptance enjoyed years ago, for interior and exterior use. It proposes to conduct research into use applications to promote skilled craftsmanship in the trade and to work on codes, standards and specifications.

Research will be directed toward preserving the industry against self destruction due to poor workmanship and in investigation of properties of new competitive materials. Under its sponsorship, a research and test program financed by the U. S. Department of Commerce is now underway at the Armour Research Foundation.

Mr. Lurie pointed out that lime was used for 90 per cent of plastering bases for interior walls 40 years ago and that it is now far down the list of materials used for the purpose. He believes that the ratio of lime in lime-cement mixes can be improved and mentioned as an example Philadelphia where lime constitutes 90 per cent of such mixtures.

There has been no new stucco applied except on the West Coast and in

(Continued on page 114)



Model of building which will house 25 specialized laboratories, including moist curing rooms, fog rooms and atmospheric rooms capable of duplicating conditions where temperatures range from minus 20 deg. F. to 130 deg. F., variations in relative humidity from 25 to 100 per cent

RESEARCH LABORATORY

Portland Cement Association to build modern laboratory at Skokie, Ill., near Chicago for expanded research program

CONSTRUCTION will soon start on a large research laboratory for the Portland Cement Association on a 15-acre tract at Skokie, Ill., about 15 miles north of Chicago.

Designed by Carr & Wright, Chicago architects, the laboratory will comprise two architectural concrete buildings of modern design connected by a covered walkway. The main building will be two and three stories high, the auxiliary building one story. Total floor area will be approximately 98,000 sq. ft.

Recognizing the need for more adequate facilities than those now occupied in the Portland Cement Association administration offices at 33 W. Grand avenue, Chicago, the association decided that the expanded research program required a new laboratory building.

The basement of the main building, 24,931 sq. ft. in area, will contain a moist-curing room, 14- x 81-ft., and an L-shaped concrete laboratory, 1300 sq. ft. in area, where large test specimens, such as beams, large cylinders and slabs will be made. Two smaller rooms will be available for special moisture exposure tests. One of these will be equipped to maintain a temperature of from 40 to 75 deg. F., with 100 per cent relative humidity.

An area of 650 sq. ft. has been set aside for air storage of concrete specimens which can be controlled at a temperature of 75 deg. F. and 50 per cent relative humidity. The basement also will contain all compressors and temperature apparatus for freezing and thawing rooms. Storage areas will be allotted for various laboratory sections, a modern and well-equipped machine shop, a mold-cleaning room, and room for the storage of aggregate. Space has been reserved in the basement for the installation of air-cooling equipment which may be required at a later date.

On the first floor of the main building, offices will be located on the south side. An auditorium with a seating capacity of 150 will be used for technical meetings. A small cafeteria will be located on this floor to serve research employees and their guests.

Field Research-Structural Development

The Field Research section includes a petrographic laboratory in a suite of three rooms. There will be a dark room for developing and printing micro-photographs. Another room will be used as an instrument-repair and calibration shop. Another room will be

devoted to work in connection with sonic vibration-testing apparatus.

The Structural Development section will share a room containing 2000 sq. ft. with the Transportation Development section. There will also be a large testing room 1900 sq. ft. in area devoted exclusively to the Structural Development section. Equipment will include a 1,000,000-lb. compression testing machine capable of handling specimens up to 10- x 40-ft. There will also be a 400,000-lb. universal testing machine for both compression and tension tests. It is also planned to install a fatigue-testing machine for tensile, compression, static, and impact loading tests.

The Structural Development room will have equipment to make and test various types of expanded aggregates. It also will have a fog room 14- x 18-ft. in area where a temperature of 70 deg. F. and 100 per cent relative humidity will be maintained. Adjacent to this room will be a controlled temperature room which can be kept at from 65 deg. to 85 deg. F. with a relative humidity of from 25 per cent to 75 per cent.

In the room shared with the Transportation Development section, there will be a ball mill, a crusher, and a gas furnace. A 15-ton capacity over-

head crane will be available to facilitate handling of heavy specimens.

Manufacturing Research

The Manufacturing Research laboratory will be equipped with a miniature laboratory furnace and chemical and physical apparatus. The Applied Research section will contain a freezing and thawing room, 22- x 40-ft., including a battery of thawing tanks, a low-temperature room at -20 deg. F., and a special room devoted to durability tests where temperatures can be maintained up to 100 deg. F. with a humidity of 90 per cent. Adjacent to the freezing and thawing room, an L-shaped area approximately 500 sq. ft. in extent has been reserved for sonic apparatus and comparators for length-change tests. Other rooms set aside for the Applied Research section include: one, 22- x 28-ft., for A.S.T.M. tests of small specimens, briquettes, etc. Adjacent will be a small moisture-curing room, 16- x 17-ft., and an autoclave room, 6- x 16-ft. A physical testing room will contain a 400,000-lb. and two 75,000-lb. compression-testing machines. There will also be special equipment for testing briquettes. One of the Applied Research laboratories will be equipped to maintain 130 deg. F. with 25 per cent to 35 per cent relative humidity.

On the first floor will be located a reception foyer, approximately 15 private offices, and a receiving room for supplies. The lobby will serve to demonstrate the charm and beauty possible in concrete with a number of

colorful murals symbolizing industry and scientific research.

The second floor of the main building will be occupied by the Basic Research section, a Transportation Development laboratory, a general chemical laboratory for the Applied Research section, a drafting room, an office supply room, general files, typing, mimeographing and mail room, a number of special laboratories, and about 20 private offices to be occupied by the vice-president in charge of research, and various department heads.

Basic Research

Space occupied by the Basic Research section will include a colloid chemistry laboratory, 22- x 23-ft., in which the temperature will be controlled within one degree of 73 deg. F. Another room, 13- x 23-ft., to be held at the same temperature, will contain X-ray and optical apparatus. There will also be an electron microscope. The general physics laboratory will be maintained at 73 deg. F. plus or minus one degree. The physical chemistry laboratory will be adjacent to an electronics laboratory with space reserved for laboratory expansion.

Transportation Development

The main room of the Transportation Development laboratory, 36- x 55-ft., adjoins a smaller laboratory, 20- x 40-ft. Equipment for the Transportation Development laboratory will include a 90,000-lb. compression testing machine and a Ro-tap machine. The large laboratory will include an

oven room, 10- x 13-ft., equipped with venting louvers. This will be used for treating and testing soils. There will also be a low-temperature room, 8- x 10-ft., to be kept at -20 deg. F. An 8- x 10-ft. fog room will be maintained at 70 to 75 deg. F. and 100 per cent relative humidity. Another small room will have atmosphere control from 30 per cent to 98 per cent relative humidity.

The drafting room will be 10- x 19-ft., and will adjoin a dark room and room containing planographing and osloid print reproduction equipment.

An office supply room, 12- x 24-ft., will adjoin a room, 22- x 39-ft., to be reserved for general files, typing mimeographing, and mail handling.

Chemistry Laboratory

A general chemistry laboratory in the Applied Research section will be 28- x 44-ft. Adjacent to this, a room, 12- x 17-ft., will be devoted to sieve fineness, turbidimeter, and air permeability tests. This room will be kept at 75 deg. F. and 50 per cent relative humidity. A preparation laboratory, 14- x 18-ft., will contain small grinding apparatus, ball mill and small crusher. There will also be a chemical storage room, 10- x 17-ft. In addition, there will be three smaller laboratories; one, 14- x 22-ft., to be devoted to alkali analysis determinations, a room, 13- x 22-ft., used as an organic analysis laboratory, and a room, 15- x 22-ft., devoted to spectroscopic determination and analysis. The main chemical laboratory will be equipped with the usual chemical benches, steam baths, furnace, compressed air jets and vacuum lines, and will adjoin a balance room.

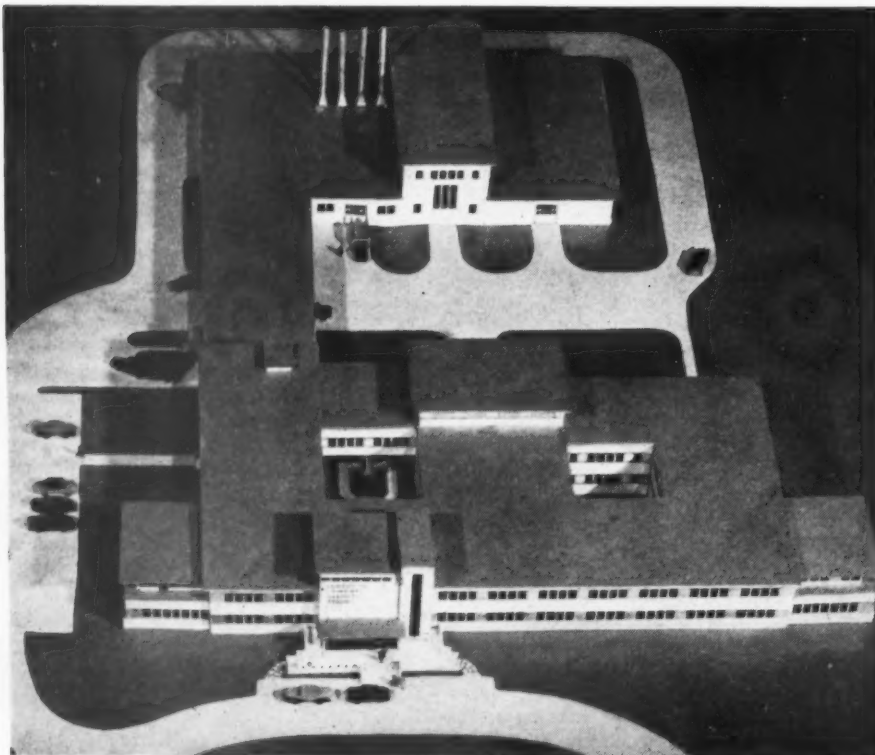
The second floor will also contain a technical library with roomy book stacks and adequate study tables. This room will have natural light on three sides. There will also be locker rooms, wash rooms, and a ladies' lounge.

A penthouse section will be reserved for the installation of air conditioning equipment.

The east section of the one-story auxiliary building will contain a warehouse, 55- x 100-ft., devoted to the storage of some 25,000 concrete specimens in the long-time study.

In the center section will be a room, 36- x 100-ft., with a 32-ft. ceiling height, devoted to industrial processes. This will contain storage bins, tube mill, jaw crusher, autoclave, a rotary furnace for laboratory study and an air separator. There will also be a 2-ton electric overhead crane and a 10-ton manually operated crane. Rooms adjacent to the center section will contain the heating plant and a room, 43- x 60-ft., for crushing and grading aggregates. This will have ample storage bins for aggregates. There will also be two small aggregates

(Continued on page 106)



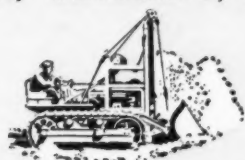
Overhead view of the model of the new research and development laboratory. Facilities within this laboratory will reproduce all the climatic conditions affecting portland cement in practical use

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TRAXCAVATOR

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THE ORIGINAL TRACTOR EXCAVATOR



gate crushers, rotary screens and a dryer. A space of 600 sq. ft. in this section has been reserved for soil processing work. A four-stall garage adjacent to the boiler room will be devoted to ground maintenance equipment.

There will be two freight elevators in the main building: one serving the basement, first and second floors, the other serving the basement and first floor only. There will be four stairways serving the first and second floors.

Pennsylvania Agstone Meeting

HARRISBURG, Penn., was the scene of the third annual meeting of the Agricultural Limestone Division, Pennsylvania Stone Producers Association, on March 17. The session opened with an address by the HON. MILES HORST, Pennsylvania Secretary of Agriculture, who stressed the need for greater conservation of soils, and commended producers of agricultural limestone on their interest in this problem. Pennsylvania is normally rated as an industrial state with about 92 per cent of the population living in towns and cities and only eight per cent living on farms, he said, hence comparatively little attention is given to agricultural needs of the state. He concluded by urging those present to give their support toward preserving and maintaining productive soils.

CLYDE A. ZEHNER, State Chairman of the Pennsylvania Production and Marketing Administration of the U. S. Department of Agriculture, spoke on the need for an accelerated conservation program for 1948. He pointed out that where in 1946 and 1947 the farmer paid only 40 per cent of the cost for his lime, he was paying 60 per cent in 1948. This, he said, coupled with revised soil conservation needs in Pennsylvania, called for an

additional million dollars for the state, raising the figure from \$1,900,000 to \$2,900,000, reflecting in an increased number of tons of lime available to the farmer. He said that the State Production and Marketing Administration had set the goal for the completion of the 1948 Liming Program as the end of September, 1948.

Mr. Zehner also advised the producers that a great many were present at the meeting for the purpose of establishing a greater degree of co-operation between the source of supply and the consumer, and led the discussion in this connection. Farmer field men and county chairmen gave suggestions for improving delivery service, hitting upon methods of loading cars with bagged material in order to facilitate unloading and decrease amount of breakages, and various types of spread service.

Following lunch, JOHN A. SMITH, publicity director for the State Production and Marketing Administration, showed films on "Phosphorus, The Key to Life" and "This Land of Ours." He reproduced a transcription of radio broadcasts designed to educate the public on the values and benefits received from the soil conservation program. These broadcasts



Dr. H. R. Albrecht, Head of Department of Agronomy, Pennsylvania State College, standing, issues a statement to a local newspaper

are being made at regular intervals over approximately 30 stations in Pennsylvania. H. R. ALBRECHT, Head of the Department of Agronomy of The Pennsylvania State College, discussed Penn State's research program.

ROY J. JORDRE, assistant to the Assistant Administrator to the Production and Marketing Administration, Washington, D. C., explained how the U. S. Department of Agriculture arrived at the soil conservation needs for individual states. He emphasized the fact that increasing the yield per acre was not enough, but that the number of acres of crop producing land also had to be increased and preserved.

"Lime Use Problems in Pennsylvania Agriculture" was discussed by DR. F. G. MERKLE of the Pennsylvania State College, who stated that research over the past 10 years had proven the need for both lime and phosphorus in increased amounts on Pennsylvania soils. Originally the scientists were certain that about 1½ tons per acre was all that was required to maintain soil fertility in the State. Today, however, they state that at least two tons of liming material per acre, applied periodically, are needed to maintain a high fertility.

The Open Producers Meeting was immediately followed by a business meeting at which time the following officers and Board of Directors were unanimously elected to serve for the year 1948: F. E. Wholaver, Bellefonte, Penn., chairman; Leonard S. Fry, Mercersburg, Penn., vice-chairman; Ellwood Gilbert, New Castle, Penn., treasurer; H. H. Wagner, Harrisburg, Penn., secretary; and directors, D. K. Shroyer, Annville, and F. Edward George, Thomasville, for the eastern section of the state; Robert B. Garman, Tyrone, and C. Roy Binkley, Dry Run, for the central section of the state; and P. E. Heim, Youngstown, Ohio, and H. W. Lamb, Branchton, Penn., for the western section.

The meeting was concluded with a careful study of an educational advertising program on a state-wide basis to show benefits derived from the use of sufficient lime.



Left to right, Dewey Hartman, Annville Stone Co., Hershey; Eugene Meckley, Meckley Quarries, Herndon; George Hepner, Selinsgrove; W. O. Faylor, Faylor Lime & Stone Co., Middleburg; and H. H. Wagner, secretary, Agricultural Limestone Division, P.S.P.A.



Left to right, John E. Claar, Sproul Lime & Stone Co., Claysburg, Penn.; Clyde A. Zehner, State Chairman, Pennsylvania Production & Marketing Adm.; F. E. Wholaver, Whiterock Quarries, Inc., Bellefonte; Shirley T. Angst, Agricultural Limestone Division, Pennsylvania Stone Producers; H. W. Lamb, Grove City Limestone Co., Branchton; and Sam O'Masta, U. S. Department of Agriculture, Washington, D. C.



It thrives on a diet of sand

Hewitt Sand Suction Hose and Dredge Sleeves grab all they can reach and yell for more

This hungry hose is like a kid at an ice cream party.

It never seems to get enough. It gobbles up sand with unbelievable speed and efficiency.

No need to tell you that you have to have a hose of great strength and durability for such a job. And that's just what you get when you use Monarch Sand Suction Hose with Monarch Dredge Sleeves. This tough team utilizes a specially compounded tube that's resistant to cuts and abrasion from sharp gravel or sands.

Remember, too, Monarch Dredge Sleeves withstand surging internal pressures, yet are flexible enough for pontoon-mounted operations.

Plan now to use these rugged run-

ning mates—Monarch Sand Suction Hose and Monarch Dredge Sleeves—for your dredging operations. You'll find that they save money, last longer and reduce replacement costs.

Phone your Hewitt distributor listed in the classified section of the phone directory. Or write Hewitt Rubber Division, 240 Kensington Avenue, Buffalo 5, New York.

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MANUFACTURERS OF INDUSTRIAL HOSE • BELTING • PACKING

HERE'S WHY YOU CAN'T BUY

A BETTER DREDGING OR

DRAINAGE TEAM

1 Spiral of spring steel wire embedded in the special high-tensile cotton duck carcass of Monarch Sand Suction Hose gives great strength and flexibility . . . prevents kinking under flexing conditions.

2 Tube of both Monarch Sand Suction Hose and Dredge Sleeves is designed to resist abrasion.

3 Monarch Dredge Sleeves have a thick layer of duck vulcanized over the cover at each end for the clamping area.

FINANCIAL

RECENT DIVIDENDS

Arundel	\$.25	Apr. 1
Basic Refractories, Inc.	.10	Mar. 15
Can. Crushed St., Ltd.	.10	Mar. 20
Cleveland Quarries Co.	.25	Mar. 31
Col. Sand & St.	.10	Apr. 30
Hercules Cement	.25	Apr. 1
Ideal Cement Co.	.40	Mar. 31
Pacific Coast Aggregates	.05	Mar. 22
Pacific Coast Aggregates pf.	1.12½	Apr. 15
Penn. Dixie Cement	.25	Mar. 15
Penn. Glass Sand Corp.	.40	Apr. 1
Penn. Glass Sand Corp. pf.	1.25	Apr. 1
Standard Silica Corp.	1.2½	May 15
U. S. Gypsum pf.	1.75	Apr. 1
U. S. Gypsum	.75	Apr. 1

U. S. GYPSUM Co., Chicago, Ill., reported net sales of \$108,405,538 for 1947 as against \$85,360,686 for the preceding year. Net income was \$16,531,744 last year as against \$12,413,955 for 1946, or \$10 per common share as against \$9.90.

ARUNDEL CORPORATION, Baltimore, Md., has published the following account of income for years ended December 31:

	1947	1946
*Gross income	\$12,502,615	\$10,613,429
Oper. expense	11,394,682	9,392,485
Adm. & gen. exp.	646,910	676,741
†Operating inc.	461,023	544,204
Other income, net	228,125	348,793
Total income	689,148	892,997
Fed. income tax	214,155	265,000
Net income	474,993	627,997
Dividends	438,349	657,524
Surplus for year	36,644	d 29,527
Earn. surplus, 1-1	3,755,248	3,797,015
Pr. yr. inc. tax		124,214
Credits		† 111,974
Earn. surp., 12-31	3,791,892	3,755,248
Earned per share	\$1.08	\$1.43
Number of shares	438,376	438,376

*Including share of net earnings from joint ventures.

†After depreciation and depletion: 1947, \$539,913; 1946, \$492,799.

‡Comprising: Reduction of provision of depreciation for prior years, \$67,011; capitalization of equipment expenses of prior years, after \$2,596 applicable depreciation, \$44,963; total, \$111,974.

JOHNS-MANVILLE CORPORATION, New York, N. Y., had consolidated net earnings of \$9,486,633 or \$3.23 per share of common stock for 1947 compared with earnings of \$5,836,613 or \$2.01 per share for 1946. Net sales were \$133,885,412 last year as against \$92,049,044 in 1946.

GIANT PORTLAND CEMENT Co., Philadelphia, Penn., listed the following statement of income for years ended December 31:

	*1947	1946
Net sales	\$2,437,182	\$2,305,750
Cost of sales	1,642,087	1,684,428
Selling, etc., exp.	286,556	259,191
Deprec. & deplet.	53,908	49,034
Operating profit	454,631	313,097
Other income, net	9,481	3,458
Total income	464,112	316,555
Loss, assets sold	2,939	15,276
Income taxes	193,750	122,600
Net income	267,423	178,679
Earn. Surplus, 1-1	88,668	d 83,011
Sink. fund dep.	140,731	57,000
Earn. surpl., 12-31	215,360	88,668
Earned per share	\$0.95	\$0.63
No. of shares	282,453	282,453

*Consolidated.

The company has announced that stockholders have subscribed to approximately 42 per cent of the 283,453 securities units offered through rights which expired on February 17. Balance of the units, each consisting of two common shares and one stock purchase warrant will be taken up by underwriters.

OHIO RIVER SAND Co., Louisville, Ky., has reported net sales of \$687,528 with a net profit, after all charges,

of \$90,767 for last year. Dividend accumulations on the first and second preferred stock amounted to \$50 per share.

NATIONAL GYPSUM Co., Buffalo, N. Y., for the first two months of 1948 had sales 18 per cent greater than for the like period last year, according to Melvin H. Bawer, president. The consolidated income account for years ended December 31 is as follows:

	1947	1946
Net sales	\$51,764,236	\$38,056,822
Cost of sales	38,165,145	27,759,636
Selling, etc., exp.	4,809,952	3,855,164
*Oper. profit	8,789,139	6,442,022
†Other income	503,612	582,721
Total income	9,292,751	7,024,743
Debt interest, etc.	358,657	286,404
Other interest		56,521
Other deductions	195,382	63,389
Fed. income taxes	3,175,000	2,335,000
Other income tax	271,548	257,897
Pr. yr. inc. tax	19,043	1,579
Net income	5,273,120	4,023,952
\$4.50 pfd. divs.	386,303	362,944
Common divs.	1,267,402	828,287
Surplus for year	3,619,415	2,832,722
Earn. surplus, 1-1	6,673,322	3,655,637
Pr. yr. tax adj.		cr 226,913
†Debit		42,950
Earn. surp., 12-31	10,292,738	6,673,322
Times pfd. divs.	13.65	11.09
Earn., pfd. share	\$59.35	\$48.92
No. of pfd. shares	88,850	82,250

*After depreciation, depletion and amortization: 1947, \$1,380,718; 1946, \$1,051,871.
†Includes \$357,651 (1946, \$393,191) profit from marine operations.

‡Expenses in connection with sale of common stock.

CONSUMERS Co., Chicago, Ill., has given the following consolidated income account for years ended December 31:

	1947	1946
Net sales	\$18,977,195	\$19,118,854
Cost of sales	16,548,368	16,917,636
Selling, etc., expense	1,148,349	1,211,846
*Operating profit	1,280,478	989,372
Other income	70,995	73,793
Total income	1,351,473	1,063,165
Interest	73,833	18,520
†Idle prop. exp., etc.	9,944	9,605
Contg. inc. tax res.	490,000	385,000
Net profit	777,696	650,040
Preferred divs.	72,173	534,805
Surplus for year	705,523	115,235
Earn. surplus, 1-1	696,654	581,419
Prop. dispo. res.	cr 275,000	
Earn. surp., 12-31	1,677,177	696,654
Earn., pfd. share	\$20.20	† \$12.29
Earn., com. share	11.94	† 4.25
No. of pfd. shares	38,492	† 38,492
No. of com. shares	59,080	† 59,080

*After depreciation and depletion: 1947, \$333,824; 1946, \$308,517.

†After depreciation: 1947, \$5,228; 1946, \$5,247.

‡Old class A shares.

§Old class B shares on participating basis.

LEHIGH PORTLAND CEMENT Co., Allentown, Penn., lists the below consolidated account of income for years ended December 31:

	1947	1946
Net sales	\$30,408,438	\$25,830,653
Cost of sales	19,572,926	16,456,662
Selling, etc., exp.	3,447,887	3,121,101
Deprec. & deplet.	1,763,097	1,529,325
Operating profit	5,624,528	4,723,565
Other income	254,698	297,347
Total income	5,879,226	5,020,912
Fed. income tax	2,285,000	1,995,000
Net income	3,594,226	3,025,912
Common divs.	1,426,097	1,426,088
Surplus for year	2,168,129	1,599,824
Earn. surplus, 1-1	5,573,752	3,973,928
Pr. yr. retire ann.	* 1,198,511	
Earn. surp., 12-31	6,543,370	5,573,752

*Additional annuities purchased under retirement plan, less pro-rata Federal taxes deductible over ten-year period.

WARNER Co., Philadelphia, Penn., reported an expected sales record of \$13,000,000 for 1947 as compared with \$11,485,000 in 1946. Net earnings for 1947 are expected to be about \$1,525,000, or approximately \$3.20 a share on 474,334 common shares. This would compare with \$1,391,800 or \$2.92 a share on 475,284 shares in 1946. The company's improvement program,

which has been underway for several years, will be completed by Spring, it is anticipated, involving expenditures of about \$4,500,000 for equipment and remodeling.

INT. MINERALS & CHEMICAL CORP., Chicago, Ill., has reported a net profit of \$1,230,008 for the six months period ended December 31, 1947, as against \$1,206,105 for the same period in 1946. Net sales for the last six months of 1947 were \$19,090,107 as compared with \$14,975,465 in the last half of 1946.

ALBERENE STONE CORP. OF VIRGINIA, Schuyler, Va., increased its net income from \$196 in 1946 to \$132,697 last year. Net sales in 1947 were \$1,151,858 as compared with \$647,305 in 1946.

GYPSUM, LIME & ALABASTINE, Paris, Ont., Canada, has published the following financial statement for years ended December 31:

	1947	1946
Net earnings	\$3,985,491	\$3,425,706
Less: Deprec.	696,386	508,013
Debiture int.	92,606	101,356
Income tax	1,745,200	1,597,000
Net profit	1,451,299	1,219,337
Less: Pref. divs.	225,000	159,326
Com. divs.	442,000	442,000
Surplus for year	784,299	618,011
Times Debiture Interest Earned:		
Before deprec.	43.04	33.80
After deprec.	35.52	28.79
Earnings per Share and Dividend Record:		
Preferred	\$4.84	\$8.13
Paid (new)	1.00	0.75
Paid (old)*		0.93
Common	2.77	2.40
Paid	1.00	1.00

*Old 5½ per cent pref. stock, redeemed April 1, 1946.

MISSOURI PORTLAND CEMENT Co. earned a net income of \$643,235, equal to \$2.20 a capital share, for 1947. This compares with \$551,226 or \$1.89 per share in 1946.

BASIC REFRACTORIES, INC., Cleveland, Ohio, and subsidiaries have reported a net profit of \$291,654 for the year, 1947, or \$.83 per share, as against a net profit of \$184,455, or \$.53 per share, in 1946.

PENNSYLVANIA GLASS SAND CORP., Lewistown, Penn., and subsidiaries report the following account of income for years ended December 31:

	1947	1946
*Earn. per com. sh.	\$3.89	\$3.20
Net sales	\$7,364,593	\$6,212,737
Oper. prof. after		
depr. & depl.	2,344,678	2,004,379
Total income	2,436,376	2,093,817
Interest, etc.	94,968	117,121
Fed. & st. inc. tax	931,760	788,960
Net profit	1,409,648	1,187,736
Preferred divs.	155,000	155,000
Common divs.	466,697	321,860
Surplus	787,951	710,876

*After preferred dividend requirements.

CONSOLIDATED OKA SAND & GRAVEL Co., LTD., Toronto, Ontario, Canada, reports a reduction in debentures during 1947 as follows: Company redeemed and cancelled \$24,800 three per cent income debentures, due March 1, 1958. As of December 31, 1947, there were \$201,000 debentures outstanding.

BLUE DIAMOND CORP., Los Angeles, Calif., had a net income of \$909,450 for the year ended December 31, 1947, as compared with \$803,410 for 1946; or \$1.24 per common share last year as against \$1.10 per share in 1946. Net sales were \$9,766,698 in 1947 and \$8,195,120 in 1946.

(Continued on page 110)

108,782,780

tons of limestone were used in construction work during 1947, plus 52,250,000 tons in industry and 21,420,000 tons in agriculture. Together with the limestone used in producing cement, it meant a busy year for Bucyrus-Erie quarry and mine shovels like the 54-B electric. Combining small shovel speed and ease of control with big shovel strength and capacity . . . with modern Ward-Leonard control for the smooth handling of shovel functions that steps up cycle speed . . . with 68 years of designing and manufacturing experience behind it — the 54-B is a "years ahead" machine that can deliver big output in tough digging hour after hour.

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Read how breaking two walnuts can start you on the road to increased profits.



Tie one of them on a string and whirl it sharply against a hard surface. See how easily it breaks ... how uniform the pieces are. That's because the breaking force was evenly distributed. This walnut was broken by impact.

Now crush the other with a pair of pliers. Much greater effort is needed.



The force is concentrated on one small area which is pulverized too fine for use. The ends of the nut remain in comparatively large, irregular pieces. More power succeeds only in producing an undesirable product.

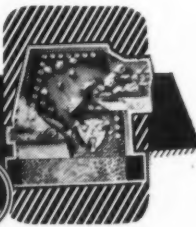
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DOUBLE IMPELLER



Labor Relations

(Continued from page 63)

tion by the people of this sovereign state upon whom the duty and responsibility of decision rests. There is then both the force of logic and the recognition and will of the people of Arizona that this is necessary and proper legislation. Together with this, there is a similar recognition on the part of the people of fifteen other states and the federal government that this is a desirable and proper use of the police power directed toward an appropriate purpose. There can be no valid argument made that such legislation is discriminatory or that its effect upon existing contracts should be limited."

Nebraska Supreme Court Decision

The State of Nebraska also has amended its constitution by several sections, the principal one of which provides: "No person shall be denied employment because of membership in or affiliation with, or resignation or expulsion from a labor organization or because of refusal to join or affiliate with a labor organization; nor shall any individual or corporation or association of any kind enter into any contract, written or oral, to exclude persons from employment because of membership or non-membership in a labor organization."

The case decided March 19, 1948, arose from allegations of the Lincoln (Neb.) Federal Labor Union (A. F. of L.) that the Northwestern Iron and Metal Co. had breached its contract by not firing a certain employee who was suspended from the union for non-payment of dues. The company's defense was that the contract was unenforceable by virtue of the adoption of the constitutional amendment quoted. This case, also, thus involved the sanctity of an existing contract. The court met this issue by noting that Section 15 of the Amendment provides that it is "self-executing"—and "it thereby became operative upon all such [existing] contracts as of its effective date. Therefore, if constitutionally valid as an exercise of the police power of the state, the amendment has application to prevent the enforcement of such provisions in all contracts, whether executed prior to or after the effective date of the amendment. As we view the matter, however, and as the parties involved herein, as well as the trial court must also have viewed it, the amendment was not intended to and could not so operate as to invalidate and make unenforceable all the other valid provisions of the collective bargaining agreement then existing between the parties. In other words, valid agreements either existent on the effective date of the amendment or entered into thereafter, would be enforceable in all respects except the provisions in such agreements which would be in conflict with the amendment."

(Continued on page 112)

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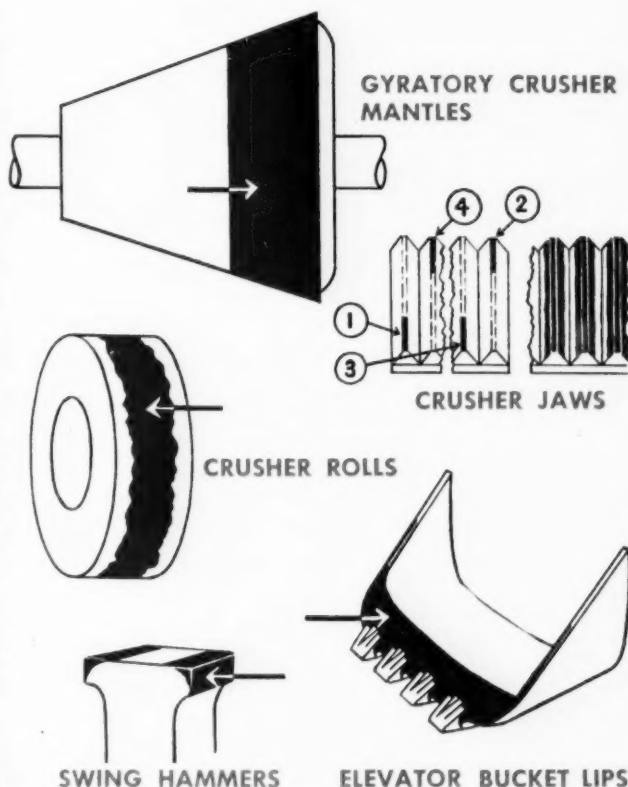
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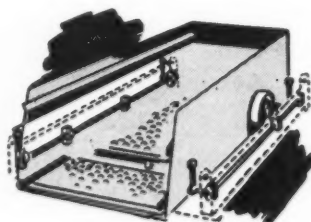
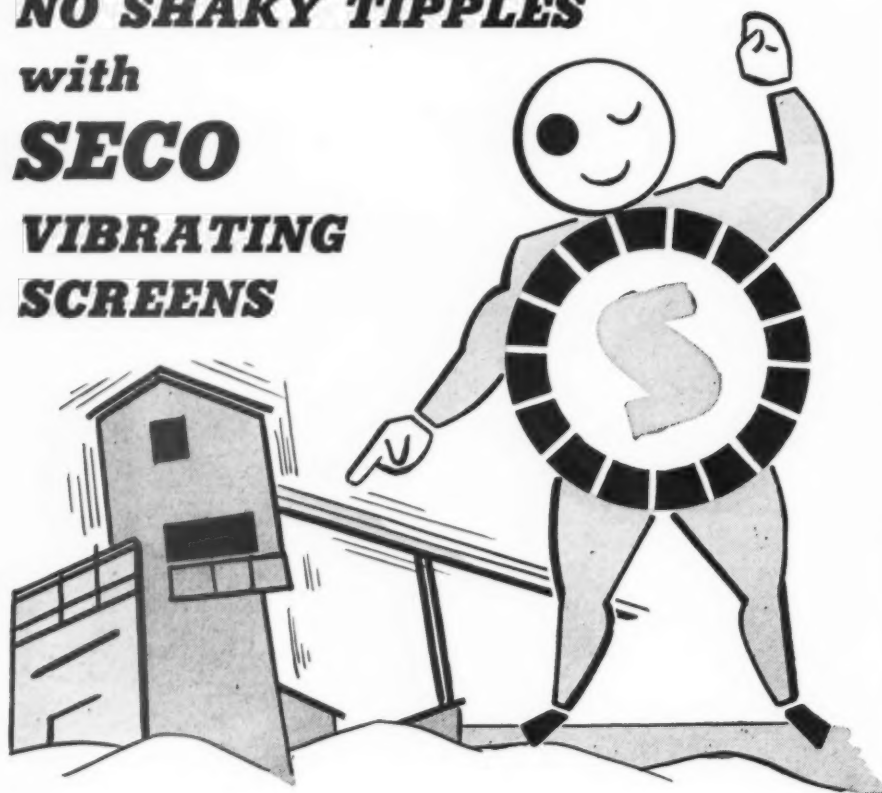
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In Canada: United Steel Corp., Ltd., Toronto

Labor Relations

(Continued from page 110)

In conclusion the court said: "It is evident that parties to a contract cannot lawfully deprive the state of its police power simply by making a contract between themselves. Since this power of the state to pass legislation which may affect existing contracts is implied in every contract drawn, then we must read this contract as if it actually provided that it was subject to any legislation which the state might adopt under its police power. With such sovereign power implied in the contract, the amendment in question did not impair the existing provisions in this contract, but was actually a part of it, and therefore not in violation of any provision of the Federal Constitution. We conclude that the amendment is a reasonable, proper and valid exercise of the police power of the state. As such, it is not in conflict with or repugnant to any federal law, but integrated therewith, and does not violate any provision of the Constitution of the United States, but on the contrary guarantees those rights to all persons whomsoever within this state, whether employers or employees, union members or non-union members."

Strong Powder Bag

AMERICAN BRATTICE CLOTH CORPORATION, Warsaw, Ind., has announced that it is now in production of its MineVent powder bags. Several advantages are claimed for the powder bags. By removing explosives from boxes outside the mine or away from the operation and carrying them in suitable bags, shot placing is speeded up and hazardous open boxes at danger points are eliminated. Made of tough, durable material designed for hard usage for long periods, the bags come in pouch type in three sizes and the knapsack type in two sizes.

Nylon-Rubber Diaphragms

UNITED STATES RUBBER CO., New York, N. Y., announces a new sheet material for pressure regulator diaphragms, consisting of nylon fabric combined with rubber. The new material is said by the manufacturer to have greater flexibility, lighter weight, higher bursting strength and improved sensitivity over the more conventional materials used for diaphragms.

Heavy Duty Oil

PENNSYLVANIA REFINING CO., Butler, Penn., has announced a new fully detergent and fully dispersive heavy duty oil, to be marketed under the trade name, Colonel Drake Heavy Duty Oil. Refined from 100 per cent pure Pennsylvania crude, the oil is said to be specially compounded for Diesel and gasoline engines in heavy duty services as it lengthens engine life and reduces maintenance costs.

Rotary Drill Bit

KENNAMETAL, INC., Latrobe, Penn., has developed a 9-in. diameter rotary drill bit for drilling overburden that contains hard shale, hard slate, limestone and some types of sand rock.

The bit has solid heat construction, three drilling prongs, and cutting edges and faces of solid Kennametal inserts. The hard points of the bit cut three different paths to form a cutting or breaking pattern of three concentric rings in the bottom of the hole. This feature enables the bit to cut hard material with ease and consequently to speed up the advance rate of the drill. Prongs of the bit are set 120 deg. apart, and they are twisted at 15 deg. from a vertical position to accelerate the movement of cuttings away from the point and to provide a much stronger edge to resist impact.

In an Ohio quarry the bit has been used to drill overburden and liquid oxygen is used as the explosive. According to the drill foreman, the amount of this explosive that can be placed in one 9-in. hole is equivalent in effectiveness to the charge in two 7½-in. holes. In this operation, the bit is used on a Hardsocg two-platform side-wall drill, and a 20-hp. motor is used to turn the bit.

Hard Drill Bit Material

CARBOMETALS, LTD., London, England, is now producing commercially a product perfected during the recent war. This cutting material is said to be as hard as tungsten, tough as steel, unbreakable and not brittle. It is further asserted that it can be molded, welded and need not be brazed; and that it can be produced in quantity from materials widely available.

In the U. S. patent covering the material it is spoken of as "an abrasive or cutting tool, comprising a body formed of diamond particles bonded together by a bond which functions as a secondary abrasive and consists of a mixture of boron carbide, silicon carbide, and at least one metallic carbide." A bit made from this material is said to withstand considerable weight, pressure and shock. It is made so that diamond pieces breaking away will not damage the crown itself and will leave a new diamond face behind them.

Nylon-Reinforced V-Belt

UNITED STATES RUBBER CO., New York, N. Y., has brought out a nylon-reinforced V-belt which is claimed to have twice the strength and four times the average life of the conventional type. The belt contains a series of tough nylon cords covered with a special synthetic rubber compound capable of withstanding the deteriorating effects of heat and oils. The belt is recommended for power transmission on equipment subject to rough usage. This belt will be distributed under the name of U. S. Royal Super Service V-belt.

New Stuffing Box Design . . .

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Since the packing is under suction or positive head pressures only, it is not subject to the high stuffing box pressures typical of conventional pumps. Therefore, it is not vulnerable to severe wear and tear of abrasive solids. Packing troubles are at an absolute minimum. But this is just one of many Morris features which mean . . .

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Easy to install! Easy to dismantle! Easy to maintain!

The Morris Type R is specifically engineered to handle mixtures containing ore concentrates . . . tailings, slag, and residue from filters and classifiers. Operates on all types of caustic or acid mixtures containing abrasives or solids.

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Lime Convention

(Continued from page 102)

Florida on account of past magnesite difficulties, which, he said, represents the loss of millions of dollars to other materials. Due to the fact that lumber and paint are up so high in price, he said that the use of stucco in an \$8000 house will save \$200 or more. The trend to the use of concrete masonry units for home construction, in place of brick, will be helpful in his opinion in promoting the use of stucco.

Agricultural Research

Agricultural research fellowship work is proceeding along many lines at the Ohio Agricultural Experiment Station according to a report by Dr. Garth W. Volk, chairman of the Department of Agronomy, Ohio State University.

Among the factors in need of study, he said, are lime's secondary effects on the soil, the effects of soil variables and types of crops as they respond to liming, methods of application, relative behaviors of dolomitic and high calcium limes and the effect on solubility (availability) of every element in the soil when limed. He mentioned that 30 elements are needed in plants and said that too much lime application actually can create mineral deficiencies.

In commenting on fineness, he said that in agricultural limestone particles coarser than 30-mesh have not

become effective after more than a year in the soil according to his tests; that the 60- to 80-mesh fraction is just as effective in neutralization as minus 100-mesh particles in neutralization. He said there is need for a good method of determining surface area of liming materials and a correlation between hardness of a product and its solubility.

Work is being done on the effects of liming in soybeans. Lime is an excellent fertilizer for this crop and is responsible for yield increases of 5 to 10 lb. per acre when applied alone.

Estimates of the need for liming in Ohio have had to be revised. In the glaciated area of western Ohio, which formerly was not supposed to need lime application, 65 per cent of the acreage now is known to need from one to three tons per acre for raising alfalfa and clover. As far as time of application is concerned, that is not considered too important. The main thing is to get the liming material applied.

Experience of the city of Baltimore in the control of corrosion of water pipe by the use of lime was discussed by EDWARD S. HOPKINS, associate engineer, Bureau of Water Supply, Baltimore, Md. The corrosion of iron pipe in acid water is retarded effectively by the addition of lime to filtered water through neutralization of CO_2 by lime. An eggshell coating of CaCO_3 is thereby formed inside the pipe. In large plants, hydrate is applied by gravimetric feeders to the filtered water. Consumption of lime in Baltimore for the purpose is 1800 tons per year or 5/10 gram per gal. of water treated. Cost of corrosion treatment is 43 cents per million gal. of water.

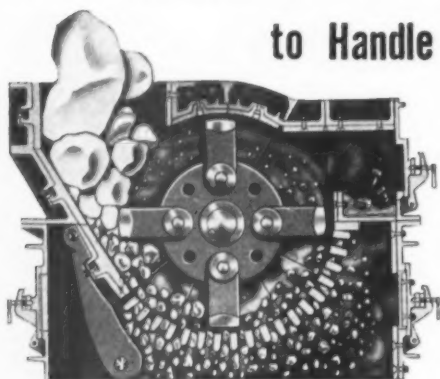
Addition of lime increases the hardness of water but this disadvantage is minor compared to the importance of protecting water pipe. Specifications call for 90 per cent CaO . Mr. Hopkins believes that the large number of smaller cities not yet using lime for an anti-corrosive constitutes a sizable market for lime to be developed.

Research Fellowship

JAMES A. MURRAY, Associate Professor of Materials, Massachusetts Institute of Technology, reported very briefly on the long range program of the Fundamental Research Fellowship at M.I.T. Work is continuing with the porosimeter in the study of flow characteristics of mortars, and autogenous healing. A thermal analyzer is being built, and one of the newer studies will be to establish porosity as a function of burning. Other studies will correlate reactivity as a function of pore size and the effects of pore size on hydrate porosities.

A. W. JOHNSON, field engineer, Highway Research Board, discussed the fundamentals of "Road Stabilization," considering particularly various soils and their characteristics, effects of climate and the influence of traffic loads and volume.

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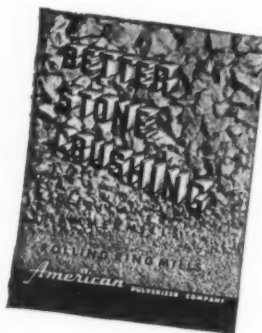
Cross section visualizing the action of the Hammermill in operation.



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Manufacturers' News

Link-Belt Co., Chicago, Ill., announces the appointment of Arthur E. Maha as assistant sales manager for the central division of the ball and roller bearing division, with headquarters at the Dodge plant, Indianapolis, Ind.



Arthur E. Maha



Lewis M. Watkin, Jr.

applied, Ind. Lewis M. Watkin, Jr., has been made assistant sales manager in the eastern division, with headquarters at Philadelphia, Penn. C. C. Wiley, formerly district sales manager at Birmingham, Ala., has been appointed district sales manager at Baltimore, to succeed H. Merrill Bowman, who has been made assistant divisional sales manager for power transmission, with headquarters in Chicago, Ill. James Tommie Bell, Jr., will succeed Mr. Wiley as district sales manager at Birmingham. Robert L. Lowder has been named district sales manager in charge of the new office in Jacksonville, Fla. He was formerly district sales engineer in Atlanta.

The Euclid Road Machinery Co., Cleveland, Ohio, has appointed T. J. Hawthorne as district manager for the states of Colorado, New Mexico and Arizona as well as sections of Texas and Wyoming. He will make his headquarters in Denver, Colo.

Lincoln Electric Co., Cleveland, Ohio, has announced a new color movie on "Designing Machinery for Arc Welding" to assist designers and engineers in the use of arc welded steel in designing all types of machinery. The movie, which has a running time of approximately 15 min., is available from the company at no charge except transportation.

Brooks Equipment & Mfg. Co., Knoxville, Tenn., announces the appointment of David S. Price, management and consultant engineer, to represent the company in the Great Lakes area, with headquarters in Chicago, Ill.

Nordberg Mfg. Co., Milwaukee, Wis., announces that Harold N. Propp, sales engineer, has been transferred to the San Francisco district office. He will assist T. D. Davis, manager of the crusher and process machinery division in that district.

R. G. LeTourneau, Inc., Longview, Texas, has announced the expansion of its marketing program with the organization of a new group of specialized distributors to handle new

Efficient Material Handling!

with

SYNTRON

"VIBRATORY" MATERIAL HANDLING EQUIPMENT

A complete line of equipment for handling bulk materials — from fine powders to big chunks — hot or cold — dry or damp — in all kinds of manufacturing processes.

VIBRATORS to eliminate arching and plugging in bins and hoppers, and to keep them open and free-flowing. Small models for little hoppers — large models for big bins and bunkers.

VIBRATORY PACKERS to settle and compact materials in various containers, from phials to barrels.

VIBRATORY FEEDERS with variable control of rate of flow — feeding materials to crushers, grinders, screens, belt conveyors, ball mills, etc. No gears, motors, eccentrics, sprockets, rollers to wear out, moving force is electromagnetic reciprocation. Available in various sizes and trough styles, with capacities from pounds to 500 tons per hour.

DRY FEEDER MACHINES, complete controlled feeding units made up with an electric vibrator on the supply hopper, assuring a free flow of material to the variable control Vibratory Feeder. Controlled feeding of dry chemical reagents in water filtration processes.

WEIGHING FEEDERS maintaining a constant weighed flow of materials in blending and mixing processes.

The power, pulsating vibrations of an electromagnet, operating from 110, 220 or 440 volt A.C. provides the driving force.

You can engineer SYNTRON "Controlled Vibration" in your new plant layout — or ease troublesome spots in your present processes.

For literature and information, write to —

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ELECTRIC VIBRATORS



VIBRATING PACKERS



VIBRATORY FEEDERS



DRY FEEDER MACHINES

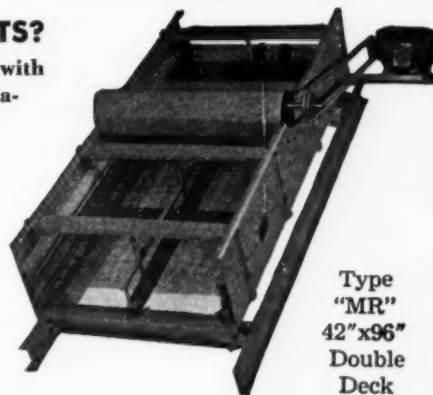


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WHY GAMBLE WITH RESULTS?

Take the hit-or-miss out of Screening with a **UNIVERSAL**! Every part of this machine has been designed to give the operator less expense and more productive efficiency.

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Type "MR" 42"x96" Double Deck



UNIVERSAL VIBRATING SCREEN CO.

RACINE - WISCONSIN



products including Tournalayers, Tournamixers, Tournacranes and Tournahaulers. Appointment and administration of this new organization will be handled from the Tournalayer Division headquarters in Longview, Texas. Present LeTourneau distributors will continue to market Tournapulls, Tornadozers, Carryall scrapers, Rooters, etc., and will continue to be directed from Peoria, Ill.

Alabama Pulp & Paper Co., Pensacola, Fla., subsidiary of the St. Regis Paper Co., New York, N. Y., has started producing paper in its new kraft paper mill at Pensacola, Fla.

Baker-Industrial Truck Division of The Baker-Raulang Co., Cleveland, Ohio, announces the appointment of the Hooper-Green Co., Indianapolis, Ind., as district sales representatives in the Indiana territory. A. J. Stone is manager at the Indianapolis branch.

Bemis Bro. Bag Co., St. Louis, Mo., announces that H. C. Davis has been appointed manager of the paper specialty plant in St. Louis, and Walter A. Kamp has been named sales manager.

Hendrick Mfg. Co., Carbondale, Penn., announces the appointment of John J. Risko, formerly with Columbia Tool Steel Co., as assistant sales manager; also the appointment of Harold A. Jope of Wethersfield, Conn., as sales representative for western Connecticut.

Jaeger Machine Co., Philadelphia, Penn., has announced the removal of

the Eastern regional office to the Widener Building in Philadelphia, Penn.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has announced the election of James M. Barker of Chicago, to the board of directors. He replaces Alfred J. Kieckhefer of Milwaukee, who has resigned. W. A. Roberts and W. C. Johnson, executive vice-presidents, have been appointed to the executive committee of the board. They replace Mr. Kieckhefer and the late Herman W. Falk. John R. Queen, Texrope sales representative in New York, has been named dealer supervisor for the Empire region covered by district offices in New York, Buffalo, Newark, Rochester and Syracuse.

H. K. Porter Co., Inc., Pittsburgh, Penn., has appointed William Lee as district manager of the new Houston, Texas, sales office. In addition to handling the complete line of equipment for the processing and refining industries, Mr. Lee will also handle the equipment for drilling and oil production manufactured by the Hinderlitter Tool Company Division, Tulsa, Okla., of which J. E. Sawtelle has been appointed export division manager with headquarters in New York, N. Y.

Marion Power Shovel Co., Marion, Ohio, has appointed John K. Dolan as sales representative in the Chicago district office which covers northern and central Illinois, southern Wisconsin, eastern and central Iowa and southwestern Michigan. John R. Hild-

inger has been made sales representative for western Ohio, a large part of the southern peninsula of Michigan and the eastern half of Kentucky. His headquarters will be at the main office in Marion, Ohio.

Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J., has announced the appointment of H. F. Groendyk as director of product sales. He was formerly manager of the Division's automotive, agricultural and aviation department.

The Colorado Fuel & Iron Corp., Wickwire Spencer Div., New York, N. Y., announces that R. R. Tatnall has been appointed field service metallurgist in charge of customer relations, and R. G. Huntress has been named manager of wire rope sales for The California Wire Cloth Corp., a subsidiary. Mr. Tatnall, who has been connected with the Morgan plant, Worcester, Mass., for 20 years, was quality control manager before his new appointment. Mr. Huntress joined the division in 1937 and has held the positions of assistant to the superintendent of the wire rope mill at Palmer, Mass., and later wire rope sales engineer.

United States Rubber Co., New York, N. Y., has announced the appointment of Henry A. Rome as manager of molded goods sales. He succeeds F. W. Archibald, who has retired after 40 years of service. J. F. "Dutch" Hensgen of St. Louis has been appointed special mining representative for the Midwestern division.

Stephens-Adamson Mfg. Co., Aurora, Ill., announces that the Pittsburgh offices have been moved to 1408-9 Investment Bldg., 237 Fourth Ave., Pittsburgh, Penn.

Bemis Bro. Bag Co., St. Louis, Mo., has purchased a 27-acre site near Wilmington, Del., for the construction of a paper bag manufacturing plant. Plans have been developed by the company and will incorporate the most up-to-date features of bag factory design.

American Brake Shoe Co., New York, N. Y., has announced the appointment of Frank B. Newbert as assistant general purchasing agent. He has been with the company since 1934 and has served in various purchasing capacities since that time.

Shafer Bearing Corp., Chicago, Ill., has announced the election of George W. Nordstrum as a director of the corporation.

International Harvester Co., Motor Truck Div., Chicago, Ill., announces the appointment of M. F. Williams, formerly retail manager at Wichita, Kans., as assistant manager at San Antonio, Texas. F. C. Mayer, retail manager at Birmingham, has been appointed assistant manager at Charlotte, N. C.

Detroit Diesel Engine Division, General Motors Corp., Detroit, Mich., has named Raymond K. Collick as parts merchandising manager. He has been assistant parts merchandising man-

THE
Economical Way
TO HANDLE

BULK Cement
BULK Agricultural Limestone
BULK Fine Aggregate (dry)



Layout for conveying material from plant to car or truck would be similar.

ROBINSON
Air-Activated **CONVEYOR**

From Crusher to Storage, from Storage to Car . . . it's here that the Robinson Air-Activated Conveyor will save you money in handling. Why?

- The Robinson System utilizes dry, low-volume air.
- It eliminates encrustation in conveyor lines which often happens in other pneumatic systems; moisture in low-volume air is readily controlled.
- There are no continuously moving parts, screw-feeds, bearings, or other parts which cause high maintenance or replacement costs.

To handle dry-pulverized or fine-granular materials in bulk pneumatically is the economical way; to handle them by the Robinson System is probably the most economical way. Our engineers will be glad to draw up Robinson plans and cost estimates for your requirements.

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Representatives in Principal Cities

Division of
MORSE BOULGER DESTRUCTOR CO.

Air-Activated

CONVEYOR SYSTEMS

211-H EAST 42nd STREET • NEW YORK 17, N. Y.

ager since 1945. In his new assignment Mr. Collick will report directly to John Ball, parts manager.

Tyson Bearing Corp., Massillon, Ohio, has announced the appointment of George C. McMullen as vice-president in charge of sales. W. H. Oexle, formerly with L. S. Starrett Co., Athol, Mass., has joined Tyson as general sales manager. Herschel J. Deal, vice-president, is in charge of the midwest territory and will make his headquarters in Chicago. Ivan C. Mann, formerly manager of replacement sales, has been named assistant sales manager. R. R. Flaisig has been made representative in the southern Ohio territory, with headquarters at the factory. E. M. Smith is in charge of the Northeastern territory with headquarters in Philadelphia, Penn., and Carl M. Behm will represent the company in northern Ohio.

The Linde Air Products Co., New York, N. Y., is completing plans for the construction of an oxygen filling station and acetylene-producing plant at Billings, Mont. It is expected that the new facilities will be in operation shortly.

Hewitt Rubber Division, Hewitt-Robins, Inc., Buffalo, N. Y., has appointed the Penn Central Equipment Co., Altoona, Penn., as a distributor in Altoona, Johnstown, Cumberland, Lewistown, DuBois and Lock Haven. Paul R. Kuhn is owner of the company.

Caterpillar Tractor Co., Peoria, Ill., has announced the following appointments: John Davis remains as manager of the new depot at Atlanta, Ga. Wilbur Legg moves from Peoria, Ill., to become assistant manager at Atlanta, replacing Ira Taylor who has been appointed manager of the new parts depot to be opened at Shreveport, La. Roscoe Booker, depot manager at Kansas City, Kans., has been transferred to Minneapolis as manager. Bill Oedewaldt leaves the Peoria parts office to become assistant manager at Kansas City, Kans. The new Minneapolis parts depot is expected to be opened this Spring. Howard Burgener, assistant parts depot manager at Kansas City, has been promoted to manager of the Kansas City depot.

Elastic Stop Nut Corp., Union, N. J., announces that the office at 115 Broadway, New York, N. Y., has been closed and that all correspondence should be addressed to the head office at 2330 Vauxhall Road, Union, N. J.

General Electric Co., Schenectady, N. Y., announces that G-E single-phase 1- to 7½-hp. induction motors, widely used on farms and in homes and small manufacturing plants, are now available for immediate delivery. The three-phase open motors up to 75-hp. can be shipped from stock.

The Pyrometer Instrument Co., New York, N. Y., has announced the completion of its new plant, laboratory and office in Bergenfield, N. J., and requests that all correspondence be directed to this address.

DIG-HAUL-DUMP



Cement mill uses Sauerman Cableway to move material from deep pit to a car-loading hopper.

*for a
FEW
PENNIES
a yard!*



Sauerman Scraper stockpiles surplus output of gravel plant; then reclaims as required direct to cars.

Cut Your Overhead with a SAUERMAN Unit

In moving material from pits, ponds, banks and stockpiles it pays to use a machine that combines digging, hauling and dumping in a continuous automatic cycle controlled by one operator.

Use a Sauerman Power Scraper if the material lies in a dry pit, bank or stockpile. Use a Sauerman Slackline Cableway if the material is under water. With either machine you are assured rapid and dependable handling at low cost. For complete information write for Scraper Catalog 19-A and Cableway Catalog 19-C.



SAUERMAN BROS., INC.
530 S. Clinton St., Chicago 7



Long Range Material Handling Machines

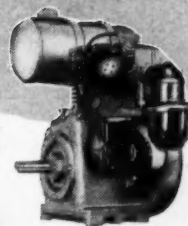
Increase The PRODUCTIVE CAPACITY of Your Mechanized Equipment with WISCONSIN *Air-Cooled* ENGINES

If you build or use any kind of equipment that is or that CAN be successfully engine-powered — there is a fairly definite certainty that you can actually increase the productive capacity of the machine by motorizing with a Wisconsin Air-Cooled Engine.

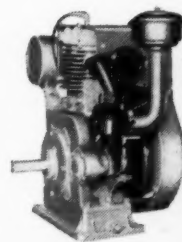
This rather broad statement is predicated on the fact that Wisconsin Engines are notable for continuous, high ratio power output as well as an absolute minimum of maintenance and servicing layups. In addition to the basic advantages of air-cooling, light weight, compact design and all-weather serviceability—you are assured of "Most H.P. Hours" of on-the-job operation, thanks to advanced engineering and heavy-duty design and construction.

Wisconsin Engines are worth looking into on all counts. Your interest will be heartily reciprocated.

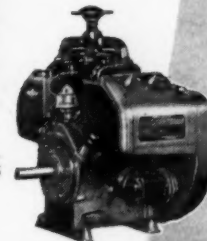
Typical 4-cycle single cylinder model, 2 to 4 Hp.



Typical single cyl. model, 4 to 9 Hp.



Typical V-type 4-cylinder model, 15 to 30 Hp.



WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 14, WISCONSIN

Faster Digging with **UNIT 1020**

UNIT takes a deep bite . . . swings fast and easy . . . moves dirt in a hurry. That's why it is the preferred excavator . . . used extensively all over the nation. Engineered for the really tough jobs with drop forged alloy steel gears and shafts completely enclosed and oil-sealed in UNIT's exclusive One-Piece Gear Case. Straight line engine mounting . . . Automatic traction brakes . . . Disc type clutches. UNIT's modern Full Vision cab promotes **SAFETY**, speeds up job. Investigate today!



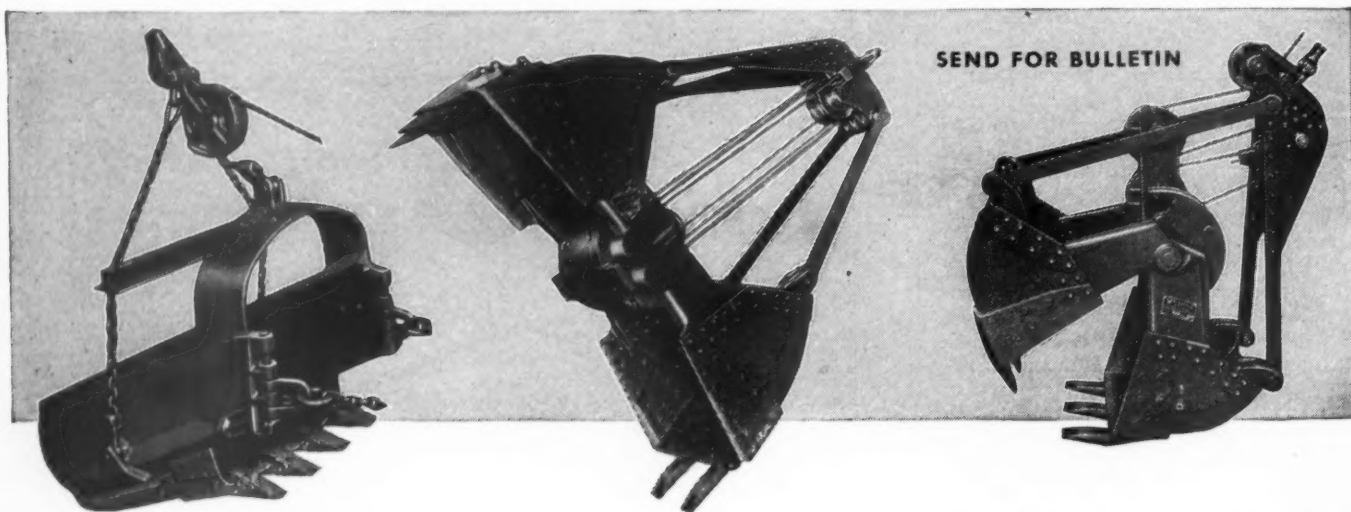
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FACTORY DIRECT**
For Price and Delivery
Or See Your Dealer



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● Count on longer life and more efficient service . . . due to Wellman original **welded rolled steel construction**. You get the maximum digging power, and exceptional strength—without excessive weight! Specify Wellman, and you'll specify the best bucket for your purpose.

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For **EFFICIENT** and **ECONOMICAL SCREENING**

For use with Vibrating and Shaking Screens, the uniformity of mesh throughout long service life is one of the outstanding advantages of Hendrick Perforated Metal Plate.

Hendrick Perforated Plate is available in any shape of opening—round, square, "squaround," hexagonal, diamond, oval, slotted, tapered—and can be supplied in any required gauge in tank, high carbon, high tensile, and abrasive-resisting steels, and in other commercially rolled metals. It is furnished either flat or corrugated. Write for full information.



Perforated Metals
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Sales Offices In Principal Cities



For spotting your cars— **JONES CAR PULLERS**

YOU will be surprised how much time can be saved in the spotting and switching of cars by using a Jones car puller. These sturdy, compact units will speed up car handling to the point where they soon pay for themselves in the saving of time and labor.

These car pullers are built by Jones as complete units with motor included if desired, or with base to take standard motor, as supplied by the purchaser. The cable drum is driven by a Jones triple reduction Herringbone speed reducer and the control station may be located at a point to give the operator a clear view of the tracks and spotting positions.

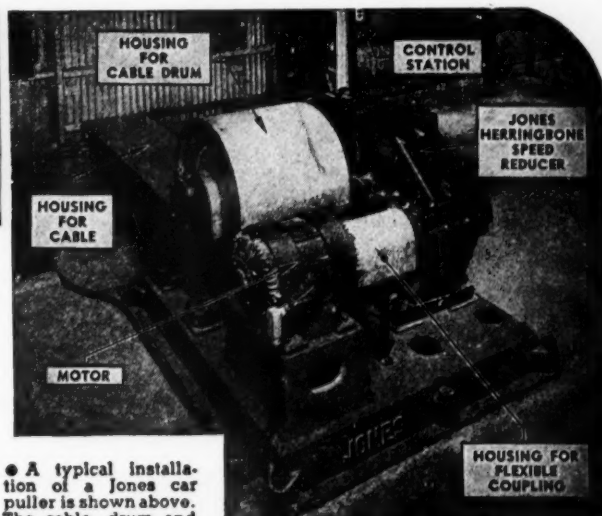
Even in plants where comparatively few cars are handled it has been found that a Jones car puller more than pays its way. Prices and complete information will enable you to judge whether such an outfit might pay out in your plant. Write for complete information.

W. A. JONES FOUNDRY & MACHINE CO.

4447 Roosevelt Road, Chicago, Illinois

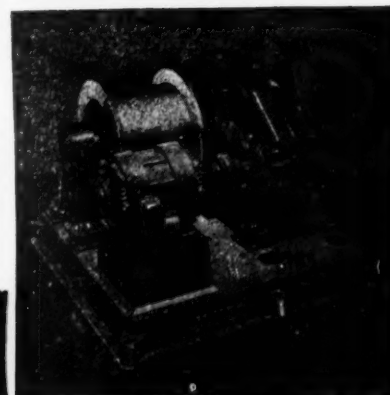
Jones

HERRINGBONE—WORM—SPUR—GEAR SPEED REDUCERS
CUT AND MOLDED TOOTH GEARS • V-BELT SHEAVES
ANTI-FRICTION PILLOW BLOCKS • PULLEYS
FRICTION CLUTCHES • TRANSMISSION APPLIANCES



● A typical installation of a Jones car puller is shown above. The cable, drum and couplings are enclosed by sheet metal housings as an extra precaution in this installation to eliminate all hazard from moving parts.

● A complete Jones car puller unit. These outfits are for use with wire rope and are manufactured in a wide range of capacities to suit the number of cars to be handled in each plant.



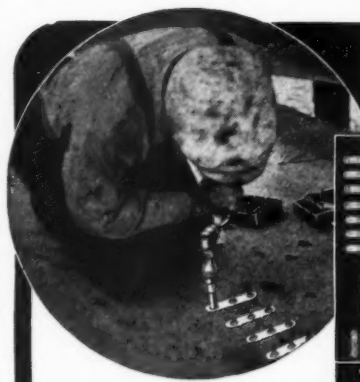
Keep your conveyors in perfect working order with

Cedarapids Conveyor Idlers

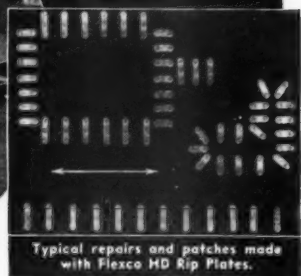


Cedarapids conveyor idlers are ideal for portable or stationary setups. Permanently sealed and lubricated for life, heavy duty, single row, self-aligning ball bearings require no maintenance. Idler rolls are of heavy gauge steel tubing to insure perfect and constant balance. Self-cleaning angle iron base provides plenty of strength and prevents building up of material that would stop rolls from turning freely. Strong, stubby spindles eliminate breakage usually encountered with long threaded shafts. And, best of all, they're ready for immediate shipment. Available in all standard sizes. 10 different standard sizes in stock. Write today,

IOWA MANUFACTURING CO.
Cedar Rapids, Iowa, U.S.A.



A stitch in time!



THOUSANDS of men in industrial plants, mines and mills all over the country are doing just what this man is doing. They are cutting costs by repairing conveyor belts with Flexco HD Rip Plates.

WRITE TODAY FOR BULLETIN F-100 that shows how easy it is to repair rips, to strengthen soft spots and to put in patches by using Flexco HD rip plates. The bulletin also shows how to make tight butt joints in both conveyor and elevator belts with Flexco HD Belt Fasteners. These fasteners are made in six sizes. Furnished in special analysis steel for general use and in various alloys to meet special conditions.



Flexco HD Rip Plate



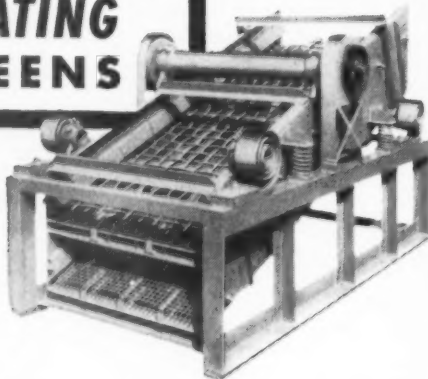
Flexco HD Belt Fastener

FLEXIBLE STEEL LACING CO.

4684 Lexington St., Chicago, Ill.

FLEXCO HD BELT FASTENERS
Sold by supply houses everywhere

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**FOR
LIGHT, MEDIUM and HEAVY DUTY SCREENING
WET or DRY**

The Double-Deck Heavy Duty 4' x 10' OVERSTROM Vibrating Screen illustrated is one of many types and sizes available for screening of crushed rock products, sand and gravel, limestone, cement, gypsum, borax, mining ores, salt, coal, coke, etc.

Screening machinery, engineered by pioneers and accepted by industry throughout the world for the past 25 years, is available for various applications, in any type or size, single, double or triple-deck models, open type or dust-housed complete with hoppers and chutes fabricated to specifications.

Write to Screening Machinery Division for Bulletin S-4.

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The features embodied in the new model GAYCO Centrifugal Air Separator make them a leading means of increasing the capacity and efficiency of all types of grinding mills. They have quick, positive adjustment. When once adjusted they are not affected by variation in speed or rate of feed.

They require very little power to operate. And they feature the exclusive GAYCO principle of rejecting coarse particles by means of a centrifugal sizing fan. They separate 99% through 325 mesh, and give 35% to 30% greater recovery of fines.

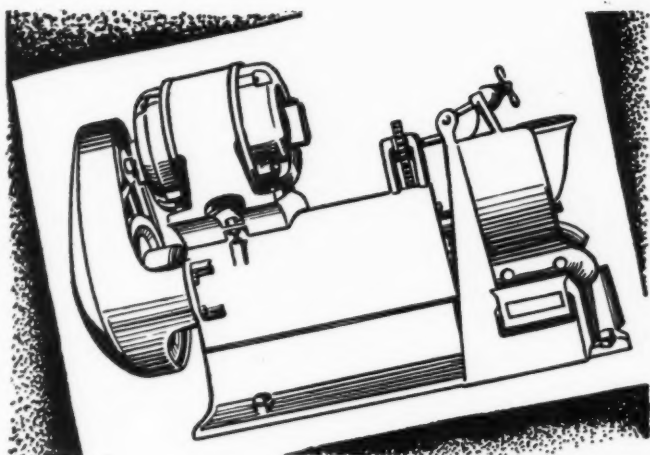
• Manufacturers also of "Reliance" Crushers, Screens, Elevators, Conveyors, Bin Gates, Grizzlies. Complete crushing, screening, and washing plants for crushed stone, sand and gravel.

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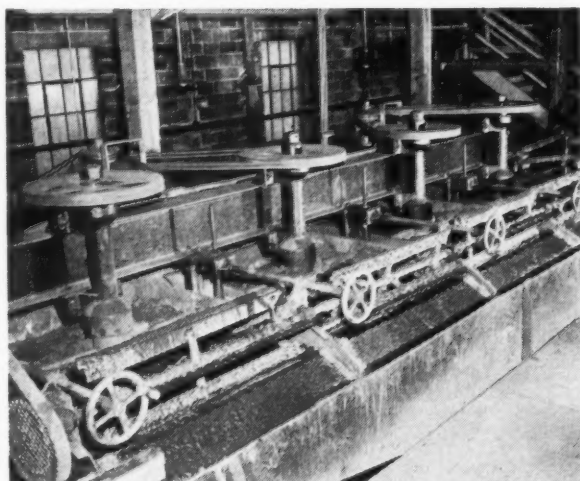
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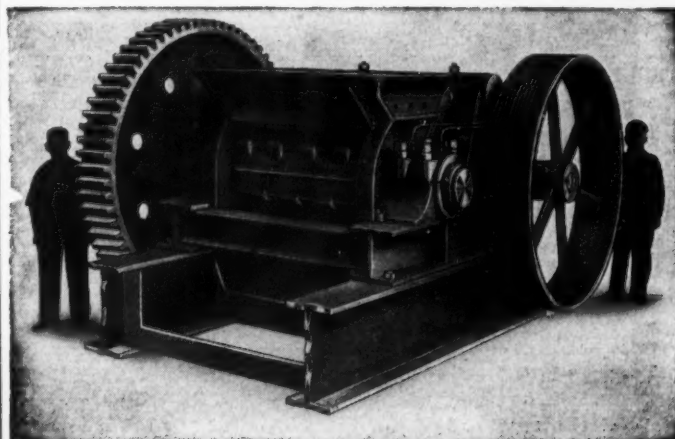


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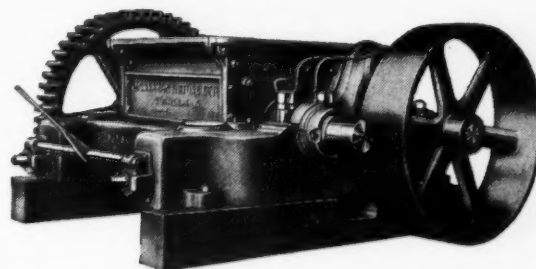
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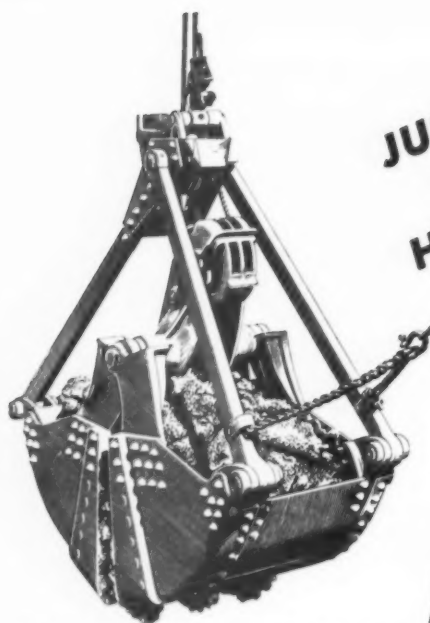


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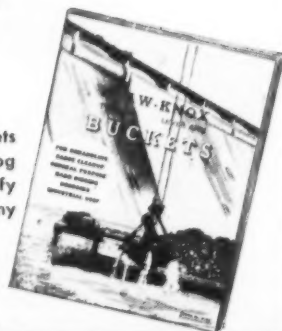
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of Blaw-Knox Co.

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CONCRETE BURIAL VAULTS

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Whether you're interested in a single piece of machinery—an entire new mill—a custom designed answer to a conveying or manufacturing problem—or a simple part such as a gear or pulley, EHR SAM is your guarantee of top quality that comes only with long experience.

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ENGINEERS, MACHINISTS, FOUNDERS AND METALWORKERS

ESTABLISHED 1872

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\$7.50
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From the SMALLEST to the LARGEST TONNAGES

TYLER-NIAGARA SCREENS

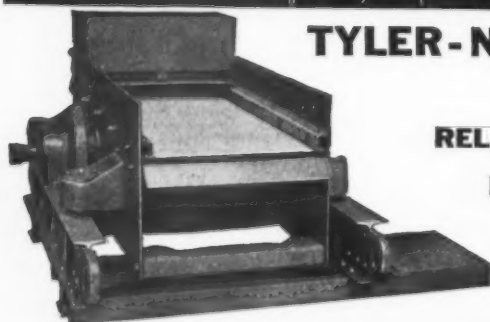
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RELIABLE

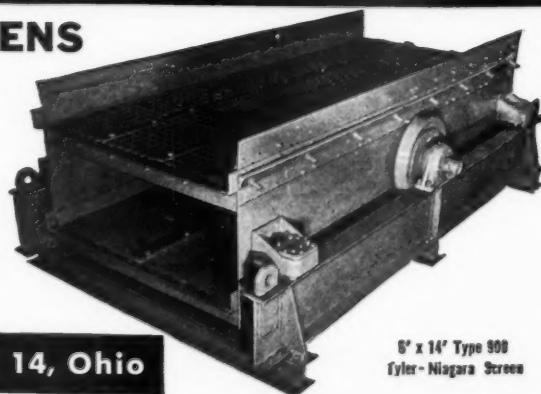
HIGH CAPACITY

EFFICIENT

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2' x 4' Type 100
Tyler-Niagara
Screen

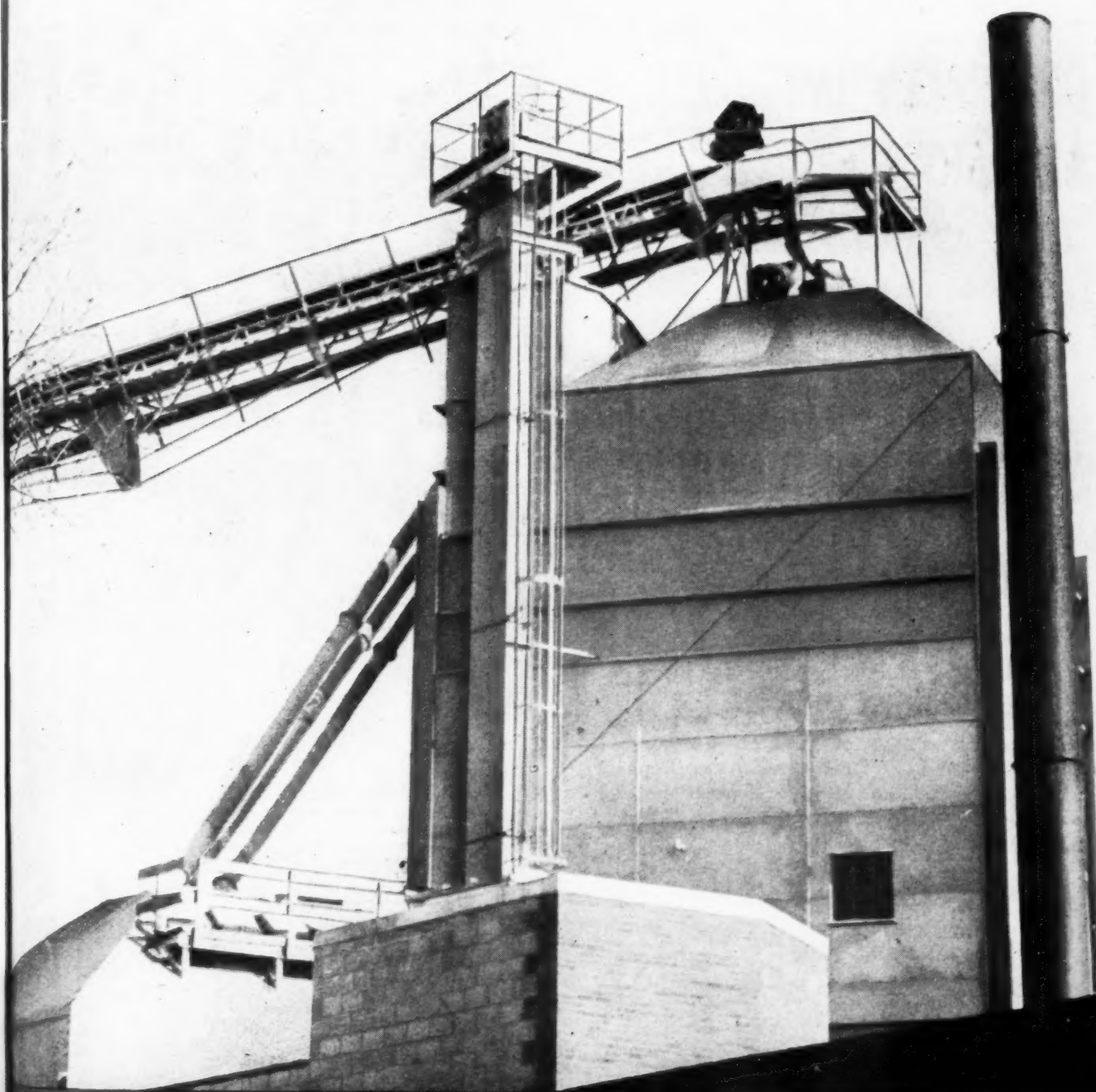


6' x 14' Type 900
Tyler-Niagara Screen

THE W. S. TYLER COMPANY, Cleveland 14, Ohio

CONCRETE PRODUCTS

CONCRETE UNITS · READY-MIXED CONCRETE



• New ready mixed concrete plant of the
Tews Lime & Cement Co., Milwaukee, Wis.

A SECTION OF
ROCK PRODUCTS

DURAPLASTIC MIX IS MORE COHESIVE

Atlas Duraplastic cement permits the use of slightly more mixing water than does regular cement. The damper mix is more cohesive—holds together better. Feeds easily through machines. Products are denser—more compact; exhibit lower absorption of water and greater resistance to passage of water.

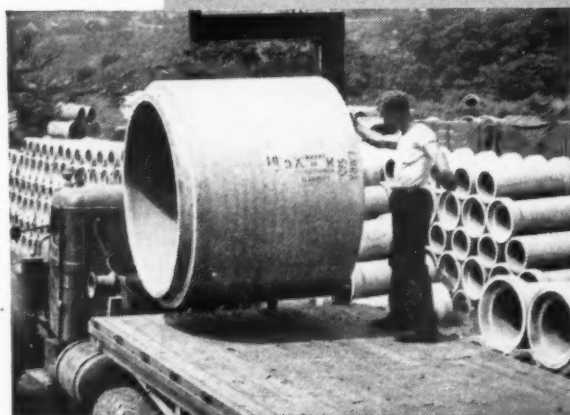
GENERALLY IMPROVES APPEARANCE

Products made with Duraplastic cement show generally improved appearance and face texture. Units are more uniform, with cleaner edges and truer dimensions.

AND CUTS DOWN BREAKAGE OF CONCRETE PRODUCTS

Compressive strength is generally increased. Block, brick, pipe, drain tile, silo staves and other concrete products are handled with less cracking and breaking, with fewer culls and throwbacks.

Atlas Duraplastic cement requires no added expense or unusual changes in methods. It complies with ASTM and Federal specifications and sells at the same price as regular cement. Send for further information. Write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.



OFFICES: Albany, Birmingham, Boston, Chicago, Cleveland, Dayton, Des Moines, Duluth, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco,

CP-D-62

ATLAS DURAPLASTIC

AIR-ENTRAINING PORTLAND CEMENT

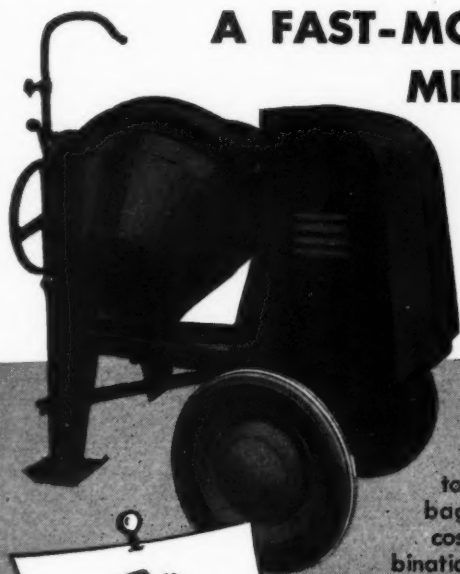
MAKES SUPERIOR CONCRETE PRODUCTS AT NO EXTRA COST

TRADE MARK REG.
U. A. C. CO.



"THE THEATRE GUILD ON THE AIR"—Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—ABC Network

A FAST-MOVING MIXER...



3 1/2-Ton Tilting Mixer. Capacity, 3 1/2 cu. ft., plus 10% overload (A.G.C. rating).



Quickly spotted and towed, this half-bag mixer is a cost-cutting combination of strength, lightness and efficiency. Other Ransome Blue Brute Mixers in capacities up to 126 cu. ft.

BUY BLUE BRUTES

AIR AT SHORT NOTICE...

A light-weight, handy compressor that can get around fast! Powers light hand-held Rock Drill, Paving Breaker or equivalent air tools through its easy-breathing Feather* Valves — with unfailing dependability and economy.

*Reg. U.S. Pat. Off.



60' Contractor's Portable Compressor. Other Blue Brute Compressors up to 500' capacity.

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Blue Brute Self-Priming Centrifugal Pump. Built in A.G.C. sizes to A.G.C. standards.



BUY BLUE BRUTES

Now! a Contractor's Pump by Worthington, the world's largest pump makers, with fast, dependable pickup that saves time and money. Rust- and abrasion-resistant, with built-in self-priming.

FOUR FAST WORKERS...

Though tough and powerful, Blue Brute Air Tools are light and compact, with the easy handling that means more satisfied workers . . . more work done . . . more profit for you.



Paving Breaker, WB-50

Rock Drill, WJ-45

Clay Digger, W-19

Backfill Tamper, W-8

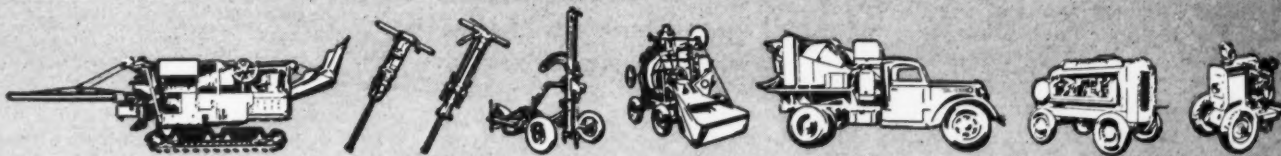
BUY BLUE BRUTES

WORTHINGTON



Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Massachusetts. Distributors in all principal cities.

H8-2



IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

INDUSTRY NEWS

Farm Wastes for Insulation in Concrete

EXTENSIVE use of farm wastes as insulation for concrete homes is anticipated by Harry Miller, University of Nebraska research engineer. Speaking before the National Farm Chemurgic Conference he said that to obtain the insulation of one inch of wood in concrete construction, a wall about 24 inches thick is required, yet a six-inch concrete wall has the necessary structural strength for many types of buildings.

Then he showed a section of a wall with a fiber-concrete interior and a concrete surface on each side. The fiber is added wet to the mixture, and the cement sets before the fibers shrink. When they do shrink a pore forms at each fiber. Consequently should the fibers become rewetted, they can only fill the pore and no warping force is produced on the building section.

The fiber-concrete section can be nailed like wood, Dr. Miller said, enabling easy placing of window and door frames. He displayed a section 5½-in. thick which is said to have an insulating value comparable to the regular frame dwelling construction. A five-room house built with walls and partitions of the material would use the pulp from about five tons of wheat straw or the fiber from 12 tons of alfalfa. Such a structure would have the fire resistance of concrete and the insulation of wood, he concluded.

Concrete Business Formed

RUSH CITY CONCRETE PRODUCTS, INC., is the name of a newly formed organization at Rush City, Minn. The new corporation will manufacture concrete light standards, blocks, culverts and bricks, as well as doing contracting work such as street paving, curb building and other construction work.

New Type Concrete Wall

R. A. BURNS, owner and operator of the Pacific Vault Co., Los Angeles, Calif., has developed a new type concrete wall, the Pacific Garden Wall, which consists of what Mr. Burns describes as "concrete lumber." The panels are 1½- x 12-in. x 9-ft. and fit into 12- x 12-in. hollow block, the latter so constructed that a wall of any length can be erected with standard lengths of lumber. Simplicity of erection is a chief feature. Three men can install close to one hundred lineal feet, 5-ft. high, in eight hrs.

Start Ready-Mix Operations

L. W. HAYES QUARRIES, Bethany, Mo., has organized the Bethany Falls Transit Mix Concrete Co. L. W. Hayes is president of the new firm; Allen W.

Linville, vice-president and K. D. Kinison, secretary-treasurer. Investment is said to be approximately \$20,000. A Heltzel batching plant, two Smith transit mixers and two Reo trucks have been purchased. The plant will be erected at the site of the crushed stone company.

Produces Pressed Concrete Masonry Unit

BRICKCRETE BUILDING PRODUCTS CO., INC., Dallas, Texas, has started production of a pressed concrete masonry construction unit. The new product, manufactured in two sizes—8- x 12- x 3½-in. and 4- x 12- x 3½-in.—is hollow, permitting wall construction with continuous perpendicular dead air columns to serve as built-in insulation space. D. A. Blankenship is president of the \$35,000 plant. Other officials are: W. L. Fouts, vice-president; M. E. Winburn, Jr., secretary; F. Gobert, treasurer; and E. M. Garner, plant manager and engineer. Present plant capacity is 10,000 units per day.

New Block Patented

ALFRED B. WAGNER has been granted a patent for a concrete block reported to eliminate dampness and permit plastering directly to the block. The new product will be manufactured by Milton Hoscher Co., Fostoria, Ohio.

California Meeting

THE CONCRETE MASONRY MANUFACTURERS ASSOCIATION of Southern California, with headquarters in Los Angeles, held its general meeting, March 30, at Easton's Rancho. Stanley Ward was appointed chairman of the committee to plan the next meeting.

Heads Ready-Mix Firm

WILLIAM H. ROHWEDER has been named manager of the Worthington Redi-Mix Co., Worthington, Minn., formerly the Concrete Aggregates Co. The plant, owned by Graves Brothers Construction Co., Melvin, Iowa, has been shut down throughout the Winter but is expected to get into production again shortly.

Block Plant Re-Opens

HENRY M. RICKEY and Edward J. Sherby have re-opened the Highland Block Co. plant in Highland, Ind.

Install New Block Machines

NORTH STAR CEMENT BLOCK CO., Pittsburgh, Penn.; Fizzano Brothers, Philadelphia, Penn.; and Best Block Co., Milwaukee, Wis., have announced plans to install a second Stearns "15" automatic plain pallet block machine in their plants.

JAKE LEVIN will place in operation this month a new ready mixed concrete plant at Oelwein, Iowa, the estimated cost of which is between \$30,000 and \$40,000. Equipment includes two trucks and a 70-ton bin divided into two portions, for sand and gravel. Materials will be shipped in by rail and unloaded by belt conveyor.

ALBERT JOHNSON, Milbank, S. D., has repurchased the block plant which he sold to Ronald Splinter approximately three years ago. Mr. Johnson originally established the business.

ATLANTIC BUILDING SUPPLY CO., Atlantic, Iowa, has installed new equipment designed to increase production of concrete block from 400 to 2000 per day.

SARGENTS CONCRETE PRODUCTS CO. and ARMSTRONG CONCRETE PRODUCTS CO., Waverly, Ohio, have moved to new locations in Waverly. Fred Foill is owner of the Sargents plant and Pearl C. Armstrong and sons, Clarence and Charles, own and operate the Armstrong plant.

UNIVERSAL CONCRETE PIPE CO., Columbus, Ohio, has placed an all-inclusive group insurance plan in effect which gives benefits of life insurance, sickness, accident, hospitalization and surgical payment coverage to employees.

WESTERN CONCRETE PRODUCTS CO., Cadillac, Mich., has installed a Besser Super Vibrapac machine for production of concrete block. Ivan N. Bernson is president of the firm.

BARTOW CONCRETE BLOCK AND SUPPLY CO., Bartow, Fla., has filed articles of incorporation listing George B. Ditewig, Helen H. Ditewig and A. F. Davis as principals, and showing a capitalization of 200 shares, no par value.

CONCRETE PRODUCTS CO., El Dorado, Ark., owned by C. R. Olson, has started the manufacture of concrete pipe in addition to its line of concrete blocks. The company also constructed a modern steam curing department.

PENNSYLVANIA SUPPLY CO., Harrisburg, Penn., has purchased a six-acre tract in Harrisburg at a cost of \$105,000 for the construction of a concrete mixing plant.

KONKRETE BLOC CO., St. Francis, Kan., has announced installation of equipment for the manufacture of pumice block. Gene Siegfried is operator of the plant.

SESSER CONCRETE PRODUCTS CO., Sesser, Ill., has opened a ready-mix plant in conjunction with its block plant, equipment consisting of a 3-compartment Blaw-Knox bin, Jaeger mixers and conveying equipment. A W. E. Dunn machine is used for the manufacture of block. Ralph E. Gordon and Everett K. Thompson own and operate the business.

MID-WESTERN CONCRETE AND SUPPLY CO. plans construction of a ready mixed concrete plant at Ulysses, Neb. Ralph Mendenhall has been named manager.

JAEGER truck mixers haul a 2-WAY PAYLOAD

*Deliver better concrete to your customers . . . bring
back repeat business to your plant*



ONLY IN JAEGER "SPEED MERCHANTS"

Analyze the important features that are exclusive with Jaeger — the dual-mix action which Jaeger developed in collaboration with leading concrete authorities and laboratories, 2 speeds for mixing, the use of top or end loading to suit different plant facilities and local aggregates, better water measurement and distribution in truck mixers and sealed drums to insure proper handling of wet-mixed material.

All are designed to produce concrete of higher strength and workability, accurately controlled for slump and delivered without segregation over any practical length of haul.

The acceptability of this product to all architects, engineers and contractors, and the ability to deliver it to a wider market area are important reasons why more concrete is supplied by Jaeger truck mixers than by any other method.

Send for new Catalog TM-8 showing latest models up to 5½ - 7¾ yd. size.

2-speed mixing and discharge

Positive water distribution with pressure pump and grout-proof, clog-proof jet

Center drive in lifetime alignment

Engine and water system enclosed from weather

Patented "dual-mixing" action

Fully streamlined — the only modern truck mixer on the road

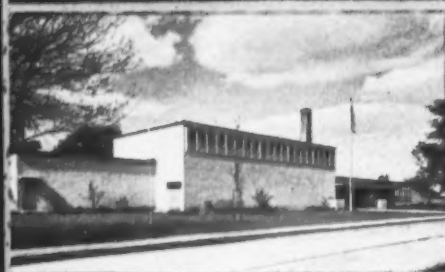
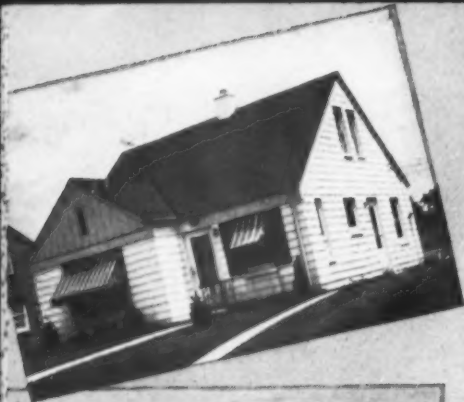
Choice of top-loading sealed drum or end-loading type



THE JAEGER MACHINE COMPANY
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CONCRETE PRODUCTS, May, 1948
A Section of ROCK PRODUCTS

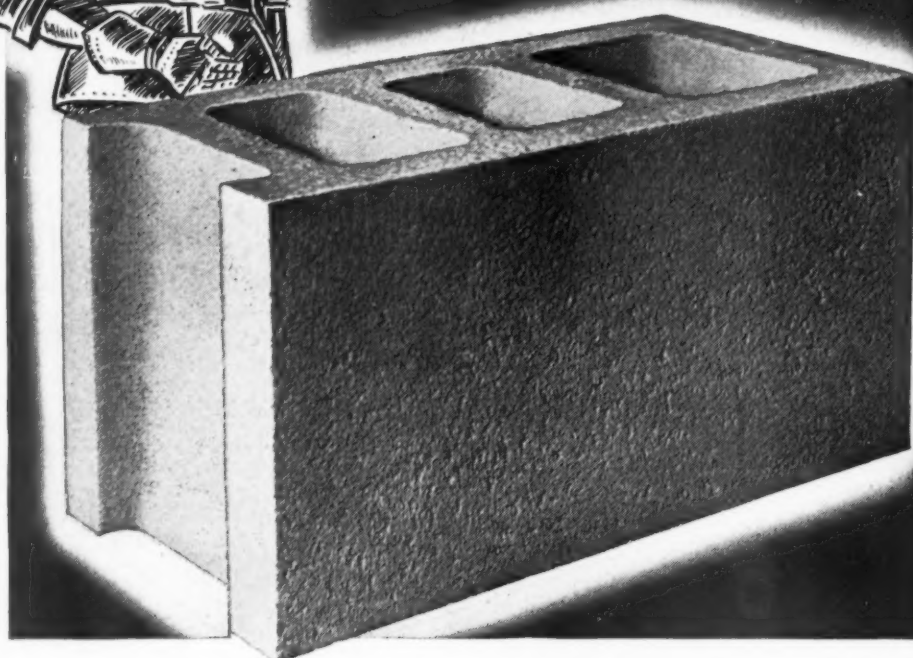
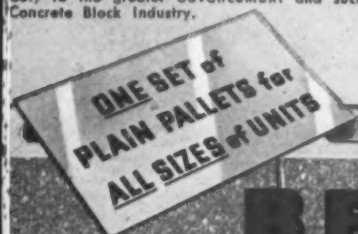


IMPORTANT PATENT NOTICE

Besser Vibrapac is licensed under Gelbman basic vibration patents. Undirectional vibration licensed under Flam patents. Also licensed under Thomas vibration patents and protected under various Besser patents and patents pending on new developments.

Besser patents and Licensor patents Nos.	2106329
1806620	1903975
2275675	2319291
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The successful high production of superior quality block by vibration and the important plain pallet stripper methods are based on developments by Besser Mfg. Co., and their licensors. These are dedicated by Besser Mfg. Co., to the greater advancement and success of the Concrete Block Industry.



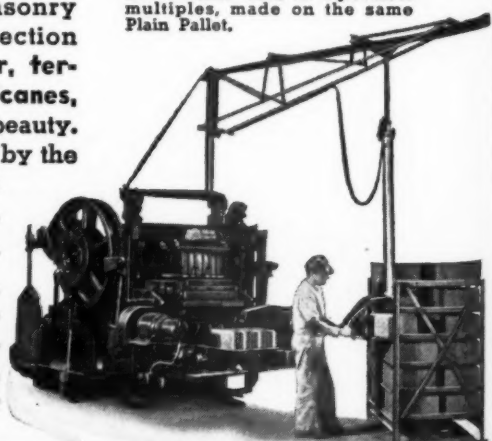
Vibrapac Concrete Masonry Units... provide ARMORED Protection

...add PERMANENT CHARM and BEAUTY to Any Building!

When your customers build with Besser Vibrapac Block, they build for permanent liveability. Vibrapac Concrete Masonry structures provide armored protection against age, climate, fire, weather, termites, rodents, tornadoes or hurricanes, without sacrificing architectural beauty. Buildings are automatically insulated by the block itself. Wall dryness assures good health and sanitary conditions.

BESSER SUPER VIBRAPACS are fully automatic, including pallet feeding. They give you continuous, full capacity operation without requiring a machine operator. One man off-bears entire block production with power hoist. Write for literature.

A Vibrapac machine produces three 7 7/8 x 7 7/8 x 15 1/2 Modular Units at a time on one Plain Pallet. Smaller sizes in equivalent multiples, made on the same Plain Pallet.



BESSER MANUFACTURING COMPANY
Complete Equipment for Concrete Products Plants
115 ARTH STREET ALBENA, MICHIGAN, U. S. A.

BESSER *Super* VIBRAPAC

Ship-lap Construction With Block of Unusual Design

Dinaburg Block Co., Binghamton, N. Y.,
cures block in kiln designed to utilize steam
from one kiln to preheat the next kiln

CONCRETE BLOCK of unusual design have been developed by the Dinaburg Block Co., Binghamton, N. Y. It is in reality two separate blocks held apart by three "Z-shaped," $\frac{3}{4}$ -in. reinforcing rods. It is also tongue-and-grooved so that the units can be laid in the wall without a great amount of skill being required as the blocks, once a level foundation is provided, fall into position without the use of level or plumb-bobs. The outside face of the block is "chamfered" and when laid in a vertical wall resembles a wide ship-lap giving the structure a very pleasing appearance. It is recommended that the blocks be laid up with mortar and, if desired, the interior space can be filled with a light-weight concrete or "Foam-Glass" as added insulation.

At the Binghamton plant, the blocks are made with coal ashes aggregate obtained from a single source. As the cinders are derived from anthracite coal firing, they are small enough so that no additional crushing is necessary. The machine used to manufacture this new type block was developed jointly by Garson Dinaburg, president of the company, and Irving Glicken, vice-president and general manager. Actual detailing of the engineering phases of the machine was in the hands of Mr. Glicken.

About 900 block per 8 hr. are produced by two men operating the machine. With special pallets, the machine will make right corner, left corner, regular, regular half blocks, and special attachments can be supplied that will permit the manufacture of inside corner blocks. The pallets cost about 60¢ each and for one machine about 1000 pallets are required.



House constructed of block designed to resemble ship-lap construction

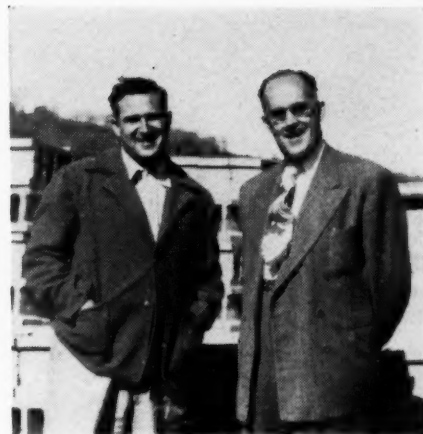
The company has been feeling its way cautiously with this new block, and has conducted that phase of its business as a side line. The main production continues to be made with a Besser tamper turning out about 340 standard 8- x 8- x 16-in. blocks per hour. A newer model of the special block machine has been developed which is to be sold outright without any royalty arrangement.

The company has calculated the relative costs of frame-type, brick veneer, and construction with its insulated blocks which are in the following ratios, respectively: 131, 163 and 85, indicating that it is at least one-third cheaper than the other two types mentioned.

In the illustrations of houses made with Dinaburg block, the exterior has a ship-lap effect that is not only very substantial but pleasing to the eye. The gabled portions have to be cut away with a masonry saw. On the interior walls it is claimed that no furring is needed as plaster can be applied direct to the wall.

For curing all types of blocks the company has five kilns, each holding 600 blocks. Ceilings are made of the ordinary 8- x 8- x 16-in. blocks with the hollow areas so connected that they act as vents for the passage of steam from one kiln to another. No mortar is laid in the joints and the blocks are supported by suitable channels. Without so intending it, Mr. Dinaburg says the fact that steam passes from one kiln to the next is an advantage as the kilns are always warm or pre-heated. The kilns are designed to hold racks in such a manner that they are substantially in operation all the time; that is, being loaded and unloaded at the same time. The company has been in the block business about 10 years.

By cleaning sacks before returning to the shipper, the equivalent of 20 to 25 bags of cement are recovered from a car shipment of cement. During these times when cement is very hard to get, this is quite an item. It was also said that due to the clean bags they got a refund from the railroad company as clean bags could be returned to the shipper in L. C. L. lots



Irving Glicken, vice-president and general manager, left, and Garson Dinaburg, president

and the railroads were willing to pay for this convenience to them.

The company is carrying out a promotional program with the Federal Housing Authority, insurance companies, architects, etc., and has placed

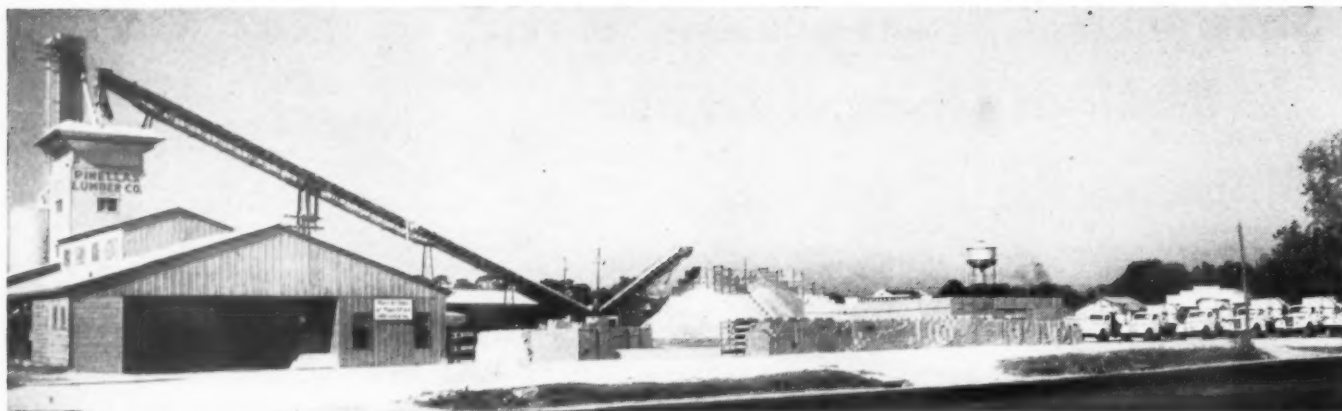


Partial view of plant and storage yard

several of its new machines with concrete masonry manufacturers. No doubt, as an auxiliary item to tie-in with a regular established block manufacturer, these new units will find a wide acceptance.



Laying some of the "chamfered-faced" block. Note how block, lower right, are reinforced



General view of concrete products and ready mixed concrete plant with neat storage area for block, to the right, aggregate storage and radial stacker in background, and long conveyor inclining up to plant storage bins, to the left. Bulk cement silo, extreme left

Sell Complete Concrete Products Line

Pinellas Lumber Co., St. Petersburg, Fla., produces ready mixed concrete, concrete block, colored tile, and joists in modern plant

ONE OF THE most progressive concerns serving the building industry in Florida is the Pinellas Lumber Co., of St. Petersburg. When the management of this company noted the trend of construction going very strongly to concrete masonry, even though it was primarily in the lumber business, a modern and very efficient block plant was built and operations started in 1946. A second plant is now under construction at Clearwater, Fla.

Between 90 and 95 per cent of the construction in the St. Petersburg and Tampa areas is of concrete masonry. About half of this construction leaves the blocks exposed or possibly painted. The other half uses a plastered exterior surface.

Office Demonstrates Block Construction

Considerable ingenuity is used by builders to get many varied effects by



Colored floor and wall tile of concrete

By W. B. LENHART

the use of concrete masonry. The new office now under construction at the block plant of the Pinellas Lumber Co. illustrates the striking effects that concrete masonry lends to the building industry. E. S. Killgore, manager of the concrete masonry department for Pinellas Lumber Co., has designed the various rooms and exterior of the office so as to illustrate to buyers of blocks the effects that can be attained. Most of the building is constructed of the standard 8- x 8- x 16-in. units, and to vary the over-all effect several innovations in masonry design are demonstrated. In one instance the blocks were staggered, leaving certain blocks protrude out from the face of the wall about 1/2-in. In other areas the blocks are set flush with the main wall and the concrete joint made flush. In other wall surfaces the joint is recessed back about 1/2-in. Different sizes, styles, and colored blocks are used effectively. The floor is of colored tile made by this company. The building is entirely of concrete masonry and steel with a concrete slab roof that has a wide over-hang. Counter tops are of 16- x 32-in. colored concrete tile, highly polished, made at this plant. Ceiling and floor joists are pre-cast concrete.

"Arizona Dobe" Block

One type of block that lends itself to decorative use and to break up the stiff lines of most concrete masonry construction is the "Arizona Dobe"

block. These units are finding a wide use in the area. "Arizona Dobe," the name given this block, is made in the 4- x 8- x 12-in. and similar smaller sizes. It is made on one of the several Appley block machines. The Besser Super Vibrapac is used to produce the more common and faster selling units. To make the Arizona Dobe, ordinary concrete is mixed in a small mixer, or even by hand (if only a few blocks are wanted). The mix is wet enough so that when the block is removed from the machine it slumps considerably and gives the corners and edges a rounded effect. The surface of the block is quite irregular. When this block has set it looks like hand made adobe used so much in the Southwest. These blocks interspersed with other structural masonry units are used in the new office building with striking effect. The Appley machines making



Arizona Dobe block

this (and many other type blocks) have been equipped with the new ejectors supplied by the Justrite Equipment Co. This device can be fitted to most hand-operated machines so that the block is automatically ejected through electrical devices. It has increased the capacity of such machines from 750 blocks per day to better than 1250. The company has four Appley machines, some of which will be used in the new plant at Clearwater. The plant under construction at Clearwater will use five ready mixed concrete trucks at the outset, and will operate one of the new Stearns No. 15 block machines.

Colored Wall Tile

One phase of this company's diversified business is the manufacture of colored concrete wall tile, using the Textone process for making the smaller tile. The tile range in size from about 6-in. square up to 24- x 24-in. with many intermediate sizes. In the Textone process a rubber form is used that not only gives a very smooth surface but allows the set material to be easily removed. Not only are the tile very beautiful, but they have been given colorful names in keeping with Florida nomenclature. "Flamingo" is the name applied to the reddish colored tints; "Seminole" to mottled effects; "Biscayne" to the green shades; "Oleta" to a buff, and "Brahma" to the whiter shades. The exposed surfaces of the tile are coated with a special wax to give a high polish and sheen. The small tile are about 5/8-in. thick, and the 24- x 24-in. are 2-in. thick and reinforced with a wire reinforcement. The large units weigh about 80 lb. each.

The writer is quite impressed with the sales advantages that accrue to a company that can give the builder a wide range of architecturally beautiful products so that a home owner can have a structure of which he can well be proud. The Pinellas Lumber



Line-up of mixer trucks with batching plant in background

Co. is setting a pattern in the St. Petersburg area that others in the far North might well consider.

The company also makes ceiling and floor joists of reinforced concrete, using Textone vibrated tile machines.

Clean Up and Service Dump Truck

Both plant and the yard, which cover most of the city block, are very neatly arranged and kept in an orderly condition. This orderliness is even extended to the help for all the colored help are supplied with a neat coverall suitably stenciled and the white help have a white jacket. To keep the yard and plants clean, steel containers are placed strategically around the plant so that any trash or broken blocks can be easily tossed into these containers. Periodically a Dempster Dumpster truck carries the containers away for disposal. The use of such equipment is very effective and economical. These operators also find that the Dempster truck can be used as an auto wrecker as the boom can be used for lifting various heavy

items, such as mixer bodies, in and about the shop and repair yard. The City of St. Petersburg has often used this company's Dumpsters on a rental basis for certain clean-up jobs.

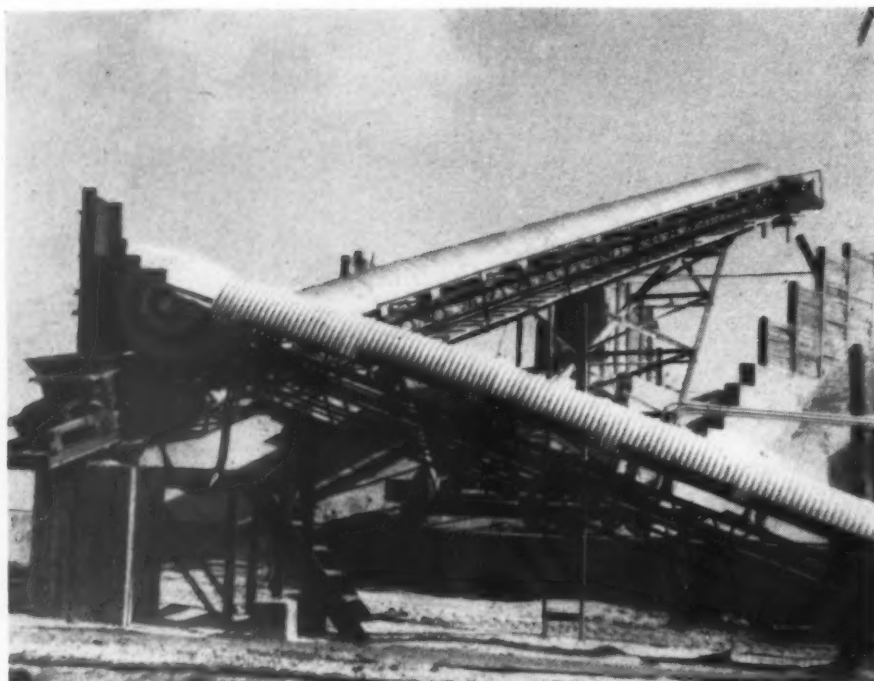


Neat storage yard with stacker to the right

A fleet of 14 ready mixed concrete trucks are operated: seven Smiths, two Rexes and five Jaegers, mounted on F. W. D., Mack, International, and Autocar chassis. As all these haulage



Left: High production block machine for standard sizes. Right: Smaller block machine for special sizes



Radial stacker operates on rail fixed to top of concrete wall

units are served by the Johnson batching plant, an economical method of handling the aggregate had to be devised.

Radial Stacker for Bin Stockpiling

A radial "stacker" was devised for this purpose. Cars of sand and gravel arriving at the plant are spotted on the company's 494-ft. railroad siding by the Atlantic Coast Line Railroad. Two spur tracks are available for car storage. The cars are bottom-dumped to a hopper serving a conveyor system that delivers the aggregate to the main stacker belt that can travel in a semi-circle and discharge its load to any of four outside storage piles or partitioned bins. These four bins hold

a total of 120 car loads; two bins are for sand, one for crushed rock for the block machines and a fourth holds what is termed concrete aggregate, a material which ranges from 1½-in. down. This equipment was designed and built by Barber-Greene company from original sketches supplied by Mr. Killgore. The radial stacker is supported near the lower end by a circular concrete wall atop of which is a steel rail curved at the same radius as the wall. The stacker assembly which rides on small diameter car wheels, is moved by a gear and chain drive from a small motor mounted near one of the car wheels. The use of this device enables the company to utilize storage space in a relatively small area to an effective degree.

Cars at the unloading hopper are moved by a G. E. car mover, using 1½-in. diameter manila rope with a short chain sling and hook at the car end. It requires four men about 40 minutes to unload a car of damp sand and about 20 minutes for the rock. This same crew unloads the bulk cement to the main Johnson silo holding 660 bbl. with a 40-bbl. capacity service silo in the center of the bins over the weighing equipment. A screw conveyor at the bulk cement hopper delivers to a bucket elevator that can discharge to the main silo or to the smaller service bin and the same equipment can reclaim the cement in the main silo. Alongside the batching plant the company maintains a warehouse for sacked cement. This sacked cement is mainly for emergency purposes.

Under the radial storage pile is a concrete tunnel which is 114 ft. long and 7 ft. high in the clear. Walls are 9-in. thick, the floor is 10 in. thick and

the top slab is 11 in. thick, all reinforced. As the ground water line in the area is only a foot or so below the surface the tunnel was made water-proof and drainage holes are provided in the walls to let accumulated water flow into the tunnel and thence into a small depressed channel in the floor. This water all flows to a small sump where an automatic float arrangement actuates a small centrifugal pump motor and ejects the water from time to time. This arrangement keeps the main floor of the tunnel absolutely dry. The Barber-Greene conveyor in the tunnel is suspended from the roof so that the floor is easy to keep clean. Aggregates are fed to the reclaiming belt by several Johnson non-flooding gates, and at each outlet, hand agitators have been installed so that the flow of material to the belt can be expedited. This agitator is simply a 2-in. pipe embedded in the roof of the tunnel. In this pipe is a suitable rod and handle so that the operator can poke up into the mass above should a stoppage occur. The tunnel belt transfers its load to another belt, 201 ft. centers, inclining up to the plant bins. This belt is 18-in. wide, but all others in the plant are 24-in. Material can be reclaimed from bins at the rate of 300 t.p.h.

Four steel plant bins hold 180 tons. Johnson batching equipment is used and the water is weighed. This equipment is so installed that it can serve the Besser machine or the fleet of ready mixed concrete trucks, or dry aggregate can be loaded direct to trucks. A considerable amount of aggregate is sold as such direct from this plant. The Appley block machine is supplied concrete by means of a small belt that receives its feed from an opening in the back of the hopper over the Besser Super Vibrapac.

Like most of the Florida producers, the "green" block are cured in the main shed for 12 to 14 hours after which all racks are moved to the yard by two Clark lift trucks and arranged in a neat row. The yard crew then cubes all the block, some on pallets. The block are then stacked in the yard and kept sprinkled for seven days or more. It takes about 2½ hours to unload a day's production of 6000 block. After clearing of the racks, the crew cleans off the pallets thoroughly as Mr. Killgore believes this assures a block of uniform height. Just before going into the machine the pallets are hand oiled. About 75,000 block are kept on hand at all times.

The "limerock" used for block in the area has considerable bonding properties of its own. In Summer a 1 to 8 mix is used and in Winter a 1 to 7. No calcium chloride is used. Owing to the inherent nature of the limestone aggregate the block are sufficiently hard and strong to handle after 12 hours so that no kilns are really needed. A Stearns yard crane is used for handling the block in the yard. All



Close-up of radial stacker, showing how it rides on rail

block and concrete brick are first cubed before they are moved and loaded by the Clark lift trucks. The company also has a Caterpillar and R-4 dozer for clean-up and miscellaneous uses around the plant. The company has a "Take About" stone saw for trimming structural units to any odd sizes desired.

This company also manufactures a 4-in. concrete drain tile on an Appley drain tile machine at the rate of 1000 per day which, with septic tanks, also made at this plant completes a foundation-to-roof service. Fence posts and precast concrete steps are the latest additions to the large variety of units made at this plant.

The company has a well equipped shop which includes: lathes, electric welder, spark plug cleaner and a considerable amount of spare parts. Up-keep of the truck equipment features washing and greasing of all dump and ready mixed concrete trucks. This work is done at night and *every night*. A special place has been provided for this work and two trucks can be greased and serviced at one time.

The plant is located in the main business section of St. Petersburg on two through thoroughfares, with a daily traffic count of 20,000 cars. The management felt that although the property was valuable for other uses, no better means of advertising could be obtained which would more than offset locating such a plant at such a place. Many visitors, especially in the Winter, each day view operations and are always welcomed. Concrete plant operators from all sections of the country have observed processes used here, and have taken many pictures



Attractive office building has rooms where various concrete products are used to demonstrate the versatility of these units

of what the management claims to be the finest concrete and block plant in Florida.

Charles Dove is in charge of the advertising department for the Pinellas Lumber Co., and Edwin Smith is superintendent of the plant.

Truck Retrieves Pallets

THE ELWELL-PARKER ELECTRIC CO., Cleveland, Ohio, has developed a pallet retriever attached to a standard

spect to the load. Rams are self-adjusting to fit and follow the contour and vertical or lateral motion of the load, while the truck with the pallet backs away and withdraws the pallet from beneath the load. The rams can be operated in corners of box cars since they may be actuated independently or together. Lime, cement, silica sand and other producers of sacked materials should be interested in this development.

Perlite Shipped Interstate

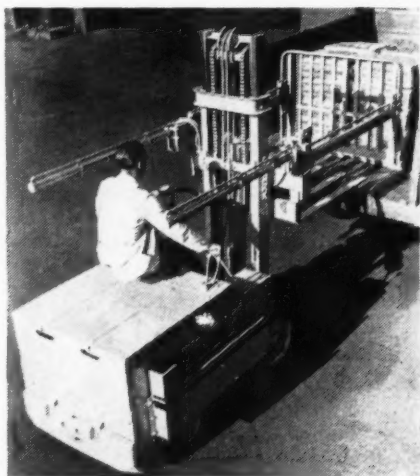
DANT & RUSSELL, INC., Frieda, Ore., shipped approximately 200 tons of raw perlite from its Lady Frances Mine to a new Dantore furnace installation at Grand Rapids, Mich. According to the Oregon State Department of Geology and Mineral Industries, this is the first time perlite has been shipped outside the state. The new furnace is expected to be completed in March, and at that time regular perlite shipments to Grand Rapids will be commenced. In 1947, the company mined and milled 2,623 tons of raw ore. Of this quantity, 2130 tons were expanded locally, producing 68,771 4-cu. ft. bags.

Pumice Company Incorporated

UTAH PUMICE & PERLITE CO., formerly a partnership known as the Utah Pumice Co., has been incorporated in Utah with a capital of \$300,000. The firm operates an open cut mine near the Union Pacific Railroad main line at Pumice in Millard County, and is headed by Byron A. Ray. Two draglines, one of one yard and the other of half-yard capacity, and a portable crushing plant with conveyor belts and built-in screens are being operated at the mine, and a mill for classifying acoustic granules of pumice is to be installed soon.



Two interior office rooms which demonstrate use of concrete products



Lift truck equipped with pallet retriever

fork-type truck whereby pallets may be used in the customary method for fast loading of freight cars yet remain in the owner's possession. With this attachment, the lift truck owner has practically all the advantages of the truck-pallet method in his own plant and also in loading cars, without loss.

This accessory is light, compact and attachable to the forward end of the truck. A load-handling or stabilizing mechanism consists of two hydraulically actuated pantagraph-type rams which terminate in a screen frame that remains in fixed position with re-

Batching Automatic Proportioning of Concrete For Big Dam Project

By W. B. LENHART

ABOUT three miles south from Cartersville, Ga., the traveler will encounter a bee-hive of construction activity. It is a big flood control project under the direction of the Corps of Engineers of the War Department. Electrical power also will be developed with an initial output of 76,000 k.w. The dam, which is across the Etowah river, will impound a lake with a shoreline at high levels of about 260 miles and will contain 253,000 acre feet of water. The structure is 1275 ft. long at road level and 170 ft. high from the stilling basin to top. Work started on the dam in May, 1947, and the job is expected to be completed by mid-1949.

There are many interesting features about this construction project of interest to readers of *ROCK PRODUCTS*. For one thing, the 500,000 cu. yd. of concrete comprising the dam structure will have a 100 per cent crushed stone-crushed sand aggregate. No sand or gravel from natural sources is being

used. Cement is a mixture by volume of 20 per cent slag cement and 80 per cent standard portland. The aggregates are prepared near White, Ga., and trucked to the dam site by a fleet of 20 semi-trailer trucks that operate night and day. Five sizes of aggregate are prepared with production being in the 3000 cu. yd. per day range. The rock is a hard, blue limestone.

Another feature of interest is the use of Darex as the air entrainment ingredient. Sufficient additive is being used to give a concrete containing 4 to 6 per cent air entrainment based on the mass concrete having minus 1 1/4-in. material. Darex is introduced at the rate of 800 c.c.m. per 4 cu. yd. batch of concrete by means of an automatic timer as the amount used is based on the time factor required for that volume to flow through an orifice. The automatic timer, supplied by the Industrial Timer Co., permits accuracy in feeding the Darex and at the same time allows the operator a cer-

tain amount of freedom of action.

A concrete mix made up of 100 per cent crushed stone and crushed sand particles is apt to be harsh with low workability, but by the use of air entraining agents the concrete has good working qualities, is more fluid and has less segregation. J. W. DRINNON, concrete plant superintendent, says that if a slip-up is made on the additive it is immediately noticed and the men who handle the concrete from the two 4-cu. yd. Smith mixers set up such a protest that no one needs to wait for any expert opinion as to what is wrong.

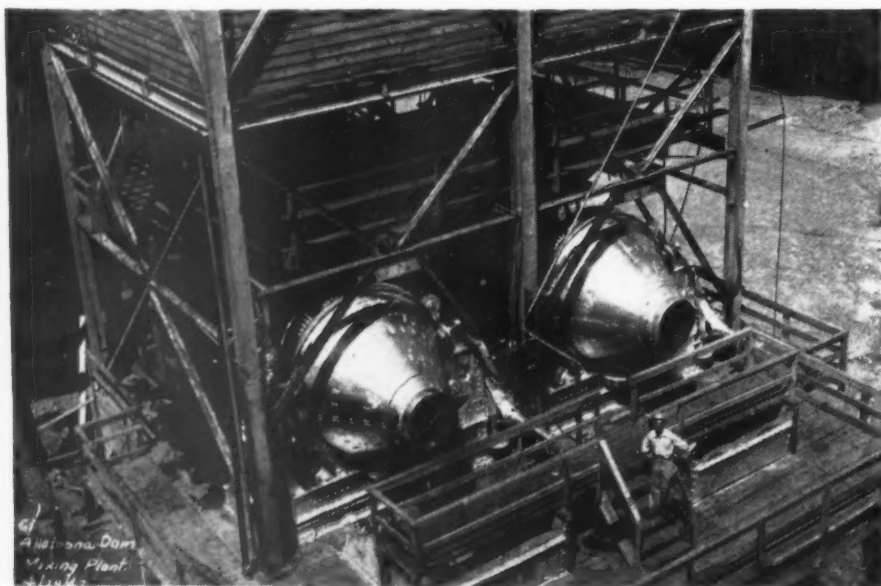
Another point of interest is that the batching equipment was specified to produce a 4-cu. yd. batch every 90 seconds with all materials to be weighed and to be controlled within unusually close tolerances. Allowable tolerances, and the tolerances actually achieved are shown in the tabulation below.

Achieved	Specified
1/5%	Water plus-minus 1%
1/5%	Cement 1%
3/4%	Minus 1 1/4-in. Aggregate 2%
(see text)	Plus 1 1/4-in. Aggregate 3%
45	Time 90 seconds

To get these results, the engineers of the National Constructors, Inc., who are the general contractors, worked cooperatively with the engineers of the Scientific Concrete Service Corporation and grouped the entire batching and mixing system into a highly integrated and efficient operation. This system embodies the use of entirely automatic gate and weighing devices. On the aggregates, for instance, the first scale beam (after closing the hopper gate) engages and opens the feed gate to the weighing hopper. When the weight approaches that desired, the gate automatically closes to about one-fourth the normal opening and material dribble feeds until the correct weight is in the hopper when the gate closes entirely. This continues until all five aggregates are in the hopper and weighed. Separate scales are available for cement and water. The water scales so function as to automatically deduct the weight of



Control panel for aggregate scale installed for convenience of operator



Two large mixers discharge to 8-cu. yd. capacity concrete buckets

BATCHING

surface water in each aggregate from the setting for total water and thus it delivers the specified quantity of total water.

A graphic recorder is also provided that records the delivered weights of cement, water, five aggregates, consistency records for the two mixers and Darex additive. This graph also shows the time limits. The Noble air-operated gates and batcher equipment for the aggregates are neatly worked into the Scientific Control moisture and scale controls. With the cement, Johnson plug batcher valves are used but the original wiring diagram was changed by Mr. Drinnon so that the accuracy was improved. The cement dribble feeds to within 4 lb. per batch of the desired amount. The over-all result was a rapid and accurate batching cycle. The time required for weighing a 4-cu. yd. batch is approximately as follows:

Aggregate scales (5)—		
aggregates (including sand)	40 to 45 seconds
Cement scales	12 to 20 seconds
Water	8 to 12 seconds

Inasmuch as the three scales operate simultaneously, the total batching time is usually about that of the five aggregates or 45 seconds.

Specifications for the crushed stone sand are as follows:

Sieve Designation	Cumulative	
U. S. Standard Sq. Mesh	Retained	Passing
¾ in.	100	0
No. 4	95-100	0-5
No. 8	80-90	10-20
No. 16	55-75	25-45
No. 30	30-60	40-70
No. 50	12-30	70-88
No. 100	6-11	89-94

It is also specified that sand delivered to the mixer shall have a fineness modulus of not less than 2.34 and not more than 3.22.

On the hopper for the cobbles, a Noble air gate mechanism has been improvised so that it functions as a punch to break any arching of this coarse aggregate. On the cement gate, a diffuser has been added that requires about 10 lb. pressure of air that aerates the cement ahead of the gate so that a more uniform flow results. It has proven a great success, according to the operators. Hot water is used in the winter time and ice water in the summer. These are mixed in a Fulton Sylphon Co. mixing valve which takes the flow of hot and cold water and mixes it to any predetermined temperatures. Here the water is mixed from 100 to 140 deg. F. in winter. In summer, ice water temperature is about 35 deg. F. Pouring is on a 10-16 hr. basis.

Cement is delivered to the plant in trucks from the rail head three miles away, and bucket elevators and a screw conveyor move it into three silos for storage. Two of the silos each hold 12 carloads of standard portland ce-



Aggregates are delivered to the dam site by a fleet of 20 semi-trailers. The eight compartments in foreground are for the various stone and stone sand sizes. Mixing plant is in the center, foreground, and cableway head tower may be seen to the left

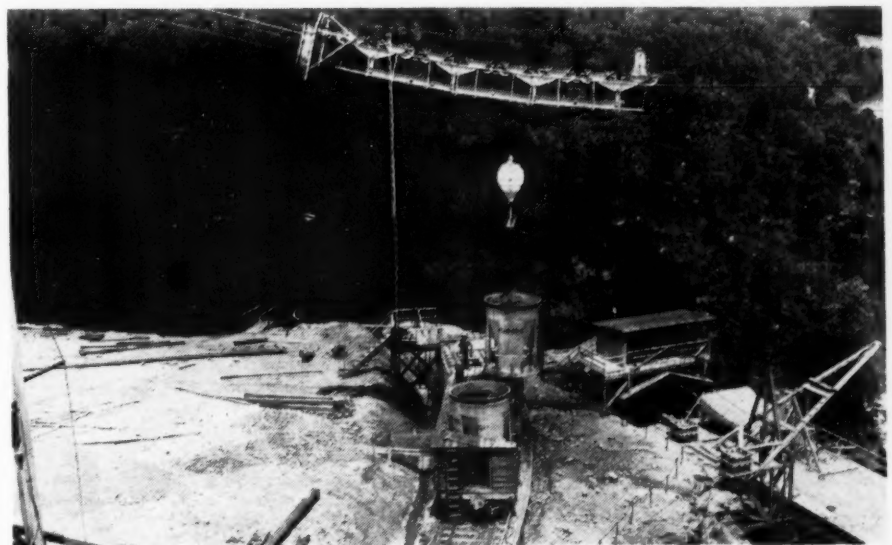
ment, and the slag cement silo holds six carloads.

Aggregate Delivery

Aggregate is delivered to the plant from the crushed stone plant by a fleet of 20 Freuhauf semi-trailers powered by White, Mack and Ford gasoline-engine driven tractors. Eighteen of these units are four-wheelers, and two are tandem, eight-wheelers. The latter haul 25 tons each. They dump to outside storage at the dam and the aggregates are delivered to bins over the batchers by a series of belt conveyors.

The specifications for the coarse aggregate are as follows:

Sieve Size U. S. Standard Square Mesh	Per Cent Weight Passing Individual Screens			
	No. 4 to ¾-in.	¾-in. to 1½-in.	1½-in. to 3-in.	3-in. to 6-in.
7-in.	—	—	—	100
6-in.	—	—	—	90-100
3-in.	—	—	90-100	0-15
2-in.	—	—	20-55	0-5
1½-in.	—	90-100	0-10	—
1-in.	—	20-45	0-5	—
¾-in.	90-100	0-10	—	—
¾-in.	30-55	0-5	—	—
No. 4	0-5	—	—	—



Cableway lifting 8-cu. yd. bucket of concrete from transfer car. Cableway will move bucket into pouring position at dam site

ent, is well known in cement circles on the Pacific Coast, having at one time been with the Conveyor Co. on concrete batching design work.

In charge for the Corps of Engineers is CHARLES A. JACKSON, resident engineer; WALTER C. KNOX, office engineer; T. L. HIGHTOWER, assistant resident engineer; and JAMES POLLATY is in charge of the concrete control laboratory, maintained by the Corps of Engineers.

The aggregate for the dam is supplied from the new plant owned jointly by Lambert Bros., Knoxville, Tenn., and the Hershaw Mining Co., Birmingham, Ala. The plant was built especially for this job but may remain in the district as a commercial stone producer.

Stone Sand Preparation

Crushed stone sand is prepared from minus $\frac{3}{4}$ -in. material from the primary screening operations. This material has its own surge pile and, before grinding in two sets of Austin rolls and two Cedarapids hammermills, is dried in an oil-fired, 3- x 30-ft. rotary drier. Drying facilitates screening. The two hammermills use 250- and 160-hp., respectively. The No. 4 to $\frac{3}{4}$ -in. stone is prepared from this same surge pile.

For screening the sand, two double-deck 5- x 12-ft. Tel-smith screens, operated dry, are used at times with three to four short lengths of different mesh sizes on the decks so as to get a

blend meeting the required specifications. The minus 200-mesh material is removed by a wet dust collector.

For the primary crushing and screening operation, a 30- x 42-in. Tel-smith jaw crusher is used to crush rock stored in a surge pile (minus 7-in. approximately). The scalping screen is a dry, double-deck, 6- x 12-ft. Allis-Chalmers screen with 6-in. and 3-in. wire on top and bottom decks, respectively. Oversize goes to the secondary crushing plant comprising a 16-B and a 48-in. Tel-smith cone crusher. The primary screen prepares the 3- to 6-in. cobbles from the middle deck. Throughs from the lower deck pass to a 5- x 12-ft. Robins, dry, double-deck screen that has $1\frac{1}{2}$ -in. and $\frac{3}{4}$ -in. wire on top and lower deck. The top deck prepares the minus $1\frac{1}{2}$ -in., plus 3-in., and the material on the lower deck is the $\frac{3}{4}$ -in. to $1\frac{1}{2}$ -in. with the throughs going to the sand surge pile. Ground storage is used for the various aggregates with reclaiming from tunnel belts. The stone is given a rinse at the loading point on a 5- x 12-ft. Pioneer screen. Only the coarse sizes are rinsed.

The plant is designed to prepare enough rock and store it so that the fleet of trucks can haul continuously. The haul is about 12 miles.

The quarry has been opened up to a depth of about 40 ft. with a second level of an additional 20 ft. being started at the time of inspection. A

fleet of five 15-ton, Euclid Diesel trucks deliver to the primary crushing plant. A $1\frac{1}{2}$ -cu. yd. Northwest and a 2-cu. yd. 51-B, Bucyrus-Erie shovel do the loading. There is about 3 to 8 ft. of soil stripping which is cast back by a $3\frac{1}{2}$ -cu. yd. Lima dragline. For primary drilling six Ingersoll-Rand wagon drills are used. Owing to the newness of the operation, blasting practice changes to meet day-to-day conditions, but essentially the drilling pattern is 20-ft. holes on 8-ft. centers with 7-ft. burden. These holes start at 3-in. with four changes of steel. Replaceable bits are used. The holes, loaded to within 6 ft. of the top with 2- x 8-in. Atlas 60 per cent dynamite, are exploded by four Atlas delay blasting caps (O-A-B and C). The ground tends to break rather blocky and some water is handled in the quarry.

At White, Ga., J. B. LAMBERT is general superintendent; J. B. HARDING, office manager; GENE BOYD, plant superintendent, and RALPH JENKINS, quarry foreman.

Open Block Plant

OWATONNA CEMENT TILE Co., Owatonna, Minn., recently started concrete block production in a new plant constructed at Medford, Minn. The company, operating a Besser Super-Vibrapac at the new plant, is owned by E. W. and L. S. Hammel.



Two views of Schell Construction Products, Ltd., Woodstock, Ontario, Canada. This plant produces 11,500 concrete block, 300-cu. yd. ready mixed concrete, plus concrete drain tile and precast concrete floor slabs, in a normal day's operation. In addition, a wood-shop producing millwork and a sand and gravel plant are operated at the same location. Complete power for the entire plant is supplied by a D13000 Caterpillar Diesel electric set, with the exception of a Symons 3-ft. cone crusher in the gravel plant, which is powered by a D8800 Caterpillar Diesel. Note overhead bins and bulk cement elevator in ready mixed concrete plant, left; plus use of belt conveyors in this compact plant

NEW MACHINERY

Truck Mixer with Octagon-Shaped Drum

CONCRETE TRANSPORT MIXER CO., St. Louis, Mo., has announced the Hi-Lo truck mixer with a 3-cu. yd. mixer drum of unusual design. This company points out that only two people are interested in the production of high quality concrete: the ready mixed concrete producer and the purchaser. When a water tank is placed on a truck mixer, the control of the quality is transferred automatically to the truck driver and the laborer on the job. No water tank has been installed on a Transport Mixer for this reason.

The Hi-Lo mixer, as it has been called, was designed by Everett D. Hunkins, of the Hunkins-Willis Lime and Cement Co., St. Louis, Mo., a pioneer in the ready mixed concrete business. This new mixer gives Concrete Transport Mixer Co. an opening into the 3-cu. yd. mixer field. For mixers up to 2-cu. yd., mounted on a single-axle drive truck, the Transport Mixer will continue to be manufactured as the most economical unit.

The Hi-Lo has a stationary drum resembling an octagon from a plan view with each of the three sides of the drum facing alternate three sides tapered down to the two end sides. Across the drum is installed the main mixer shaft, made of 5-in. cold rolled seamless tubing with a 1-in. wall thickness, designed for great strength and reduced weight. Attached to this shaft are the blades arranged to resemble a side paddle wheel on a Mississippi steamboat, cut in half and off-set as half moon sections on the shaft.

Each mixer half wheel has breaker bars located at intervals on the chord

of the wheel to provide the mixing action on the outer circumference of the drum. On a shorter radius, an inner pocket is constructed to pick up concrete and give it a combination blading and shoveling mixing action. With the tapered design of the drum, all of the material flows down the sides to come into contact with the mixing wheels. The off-set spacing of the wheels equalizes the power requirements to save gas and provide smoother action.

Where the main shaft penetrates the drum, it is supported by tapered double row self-aligning roller bearings protected by a constant oil-fed packing gland. The outer drum shell is lined with a one-piece steel liner to maintain the drum in its original condition and provide for easy replacement. The discharge gate is the sliding type operated by pinions working on a rack to accomplish positive cut-off.

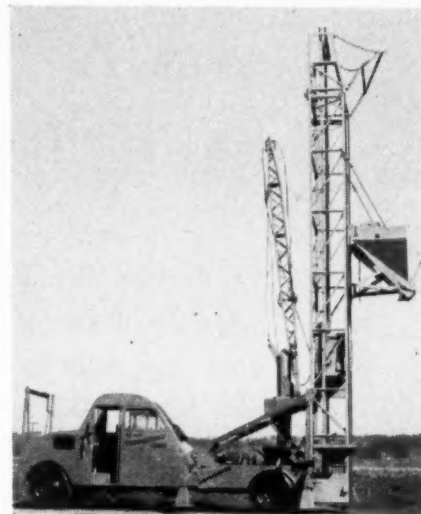
On standard installation, power is transmitted from the truck motor by means of a power take-off to a two-step, two-speed gear reduction, and then by chain and sprocket to the mixer shaft. This two-speed operation provides a mixing speed of 8 to 16 r.p.m. and an agitating speed of 2 to 6 r.p.m. A separate engine is also offered as an alternate to the power take-off arrangement.

At present the 3-cu. yd. size is the largest available, but this unit is rated as a 4¼-cu. yd. agitator when operated from central mixing plants. This unit has been job tested by truck mixing 4¼-cu. yd. at 3-in. slump. The manufacturer is recommending the use of a 2- to 3-ton chassis equipped with tandem axle drive on installations where the mixer will be used up to 4¼-cu. yd. For application where the 3-cu. yd. limit as a mixer will not be exceeded, it is recommended that a

single axle, two-speed chassis be used with 145-in. wheelbase for proper wheel distribution.

Mobile Tower-Crane

MIXERMOBILE MANUFACTURERS, Portland, Ore., has developed the Towermobile-Crane which is a further



Tower-crane equipment set up with 1½-cu. yd. concrete hopper

development of its Towermobile. The addition of a crane boom to the Towermobile chassis, without removal of the tower, provides a more versatile machine. Originally the Towermobile was designed to be driven to the job, erected in from 10 to 15 minutes by one man, ready for hoisting concrete or other building materials. With the new equipment, these same operations can still be accomplished, but the operator also has a 20-ft. boom with a lifting capacity of 9000 lbs. on a line 7 ft. to the rear of the truck chassis. The tower can be completely removed from the chassis and set to one side by the machine's own boom.

The 20-ft. crane boom can be increased in length in increments of 10 ft. up to a maximum of 40 ft. Boom swing is 360 deg. and elevation is 85 deg. Lifting capacity with standard boom is 9000 lbs. The standard tower section is 35 ft. high with one 10-ft. extension included which gives a hoisting height of 45 ft. Lifting capacity of the tower section is 6000 lbs.

Enamelled Chutes

THE ERIE ENAMELING CO., Erie, Penn., has developed its "Slide-Fast" porcelain enamelled chutes for handling concrete mix, both on trucks and on job sites. Advantages claimed for enamelled chutes include greater speed, less spillage and longer chute life. It is said that the smooth surface reduces friction and wear to a minimum, and eliminates the problem of cleaning after use as a water wash is generally sufficient to remove even partially dried concrete. It has been used for years for both coal and coke, and recently was placed through field tests in handling concrete.



Truck mixer with mixing mechanism resembling a side paddle wheel on a steamboat, cut in half and off-set as half moon sections on the shaft

Material Handling

One Man Controls Two Mixers and Materials Flow

Nashville Brecko Block & Tile Co. has efficient system of moving cement and aggregates from cars into plant bins. Mixers operate on track on mezzanine above machines

By DAVID MOCINE

EXPANSION from a plant originally built around two small block machines to one housing two 600-block per hour machines is the story of Nashville Brecko Block & Tile Co., Nashville, Tenn. Until recently the plant operated two 9-hr. shifts, five days per week; but this has now been cut back to two 8-hr. shifts for better labor relations and a higher quality product.

Use Crushed Gravel and Sand

Cinders, at one time forming all lightweight aggregate at this plant, are no longer used, but a Jeffrey-Traylor hammer mill and a Tyler double-deck vibrating screen for processing cinders are still in place and ready for operation. An integral part of this system is an electro-magnetic belt pulley tramp-iron separator that was fabricated in the completely equipped company shop. The principal aggregate now used is a prepared sand and gravel gradation delivered by truck from the Nashville plant of Cumberland River Sand & Gravel Co.

Clamshell unloading material from railroad cars and dumping to a 50-ton hopper feeding bucket elevator

This aggregate, 100 per cent passing $\frac{1}{2}$ -in. mesh, contains processed sand and represents about 30 per cent fines.

Carroll Strohm, secretary-treasurer and general manager of the plant, is the only full time, active officer of the corporation. Mr. Strohm prefers crushed gravel and manufactured sand because, in his opinion, it yields a better mechanical bond with cement paste. Brecko block using sand and gravel aggregate, have a compressive strength of 800 p.s.i. after 24 hrs. In present production, the ratio of sand and gravel to lightweight aggregate block is 55 to 45 per cent, but if lightweight aggregate were available at a reasonable price, the ratio would probably be 25 per cent sand and gravel and 75 per cent expanded slag.

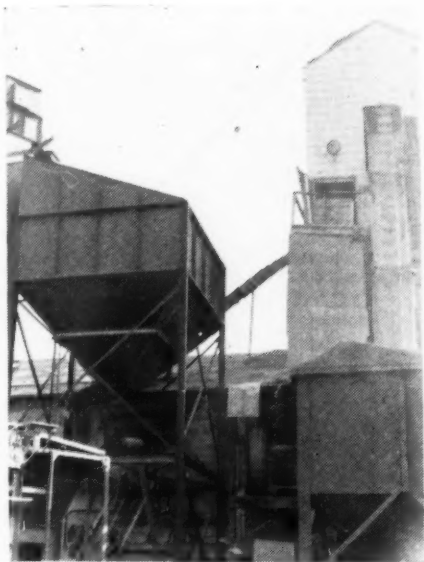
Two 42-cu. ft. Stearns traveling

concrete mixers operate over a track on a mezzanine floor directly over two Besser Super Vibrapac block machines. The two mixers are usually both in operation at the same time, but in case one is out of service for any reason, the remaining mixer can keep both block machines supplied. Receiving aggregate and bulk cement from overhead bins, both traveling mixers are controlled by one man from a single control panel. This arrangement not only makes a smoother operation, but represents a saving in man-power and incorporates a safety factor in case of an equipment breakdown.

A screw conveyor on 14 ft. centers delivers bulk cement from track hopper to bucket elevator. The bucket elevator, on 75 ft. centers, elevates the cement to a 500-bbl. capacity bin which discharges to a weigh-hopper through a second screw conveyor. Blaw-Knox Co. engineered and manufactured the overhead bin and material transfer system. Lightweight aggregate, delivered in gondola rail cars, is unloaded by a Clyde Iron Works crane having a $1\frac{1}{4}$ -cu. yd. clamshell bucket. Power for the clam shell operation is delivered through an American Hoist & Derrick Co. hoist from a 35-hp. Westinghouse electric motor. The railroad siding is capable of holding ten cars, with spotting done by gravity.



Under-cover cubing area for rainy days



Bulk cement bin and bucket elevator. Note screw conveyor into plant

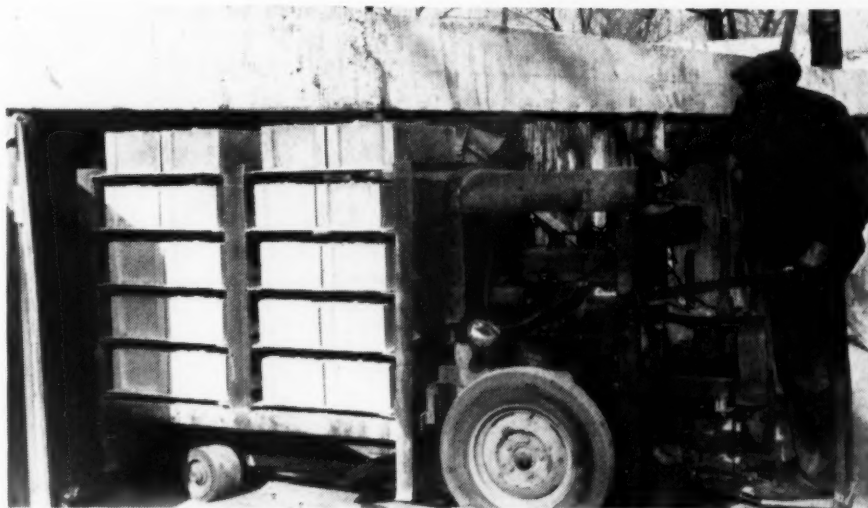
Sand and gravel aggregate brought in by truck is dumped to a pit adjacent to the rail siding for transfer by the clam shell to the hopper feeding the bucket elevator. The aggregate elevator, 60 ft. centers, elevates material from the surge hopper to overhead aggregate bins in the plant with a total capacity of 125-cu. yds.

Curing Cycle

At present loaded block racks are transferred from block machines to kilns by two Yale & Towne "Work-saver" electric lift trucks of 4000-lb. capacity. Originally, a Hyster lift truck was purchased for this purpose, but there was not sufficient room for maneuvering, and this unit is now used as utility equipment. Two Erickson platform trucks remove block from the kilns to storage. The curing cycle for the seven kilns, each holding 1320 block, is 2-hr. live steam (averaging 175 deg. F.) followed by a 3-hr.



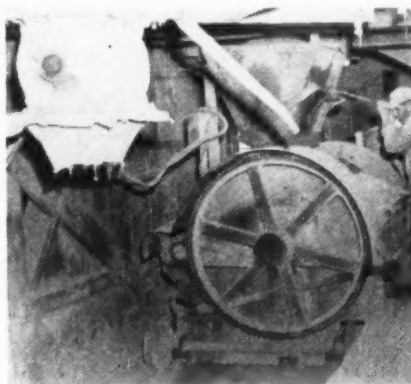
D. O. McIntosh, superintendent



Platform truck removing racks of block from kiln

soaking period. Steam for curing is produced by a 100-hp. oil-fired Cyclotherm steam generator, carrying 85 lb. pressure.

In the past the plant produced con-



One of two 42-cu. ft. traveling mixers; one man controls both mixers from single control panel

crete joists and floor slabs plus other specialties, but at present all work is confined to modular size block. Having five acres for storage use, the space-saving factor associated with cubing is no consideration here; nor is the factor of labor-saving by cube-loading outgoing trucks relevant due to the fact that the majority of orders leaving the plant are made up of anywhere from two to four different sizes.

Total sales represent possible 70 per cent credit and 30 per cent cash. One quarter of all sales made are represented by retail cash-and-carry trade right at the yard. Block are sold over a 50-mile radius from the plant, with rural or farm trade accounting for 20 per cent of total sales. The company operates two new 2-ton cab-over-engine Chevrolet delivery trucks, a 1½-ton and a 2-ton G.M.C. truck, the latter with conventional bodies. Four contract haulers also are kept busy. It is planned to add additional trucks until two-thirds of all deliveries can be made by company trucks.

J. W. Jakes, president, and B. Dickerson, vice-president, are both non-active members of the corporation. D. O. McIntosh is plant superintendent.

California Mineral Industry

A REVIEW of the entire mineral industry of California during 1947, non-metallic as well as metallic, is covered in a pamphlet recently issued by the California State Division of Mines. In the non-metallic field, the alphabetic list runs from asbestos to talc.

Each of the 47 minerals listed is treated in a separate section, complete with a short historical background and importance of local production in relation to total U. S. or world output. Economic position of each mineral is discussed in relation to war-time demand or pre-war demand, as well as extent and purity of present deposits being worked and probable future position from standpoint of yet unworked deposits. Methods of recovery, with labor costs versus flotation, or other mechanical recovery processes are mentioned in applicable fields.

Pavement Yardage

AWARDS of concrete pavement for the month of March and for the first three months of 1948 have been announced by the Portland Cement Association as follows:

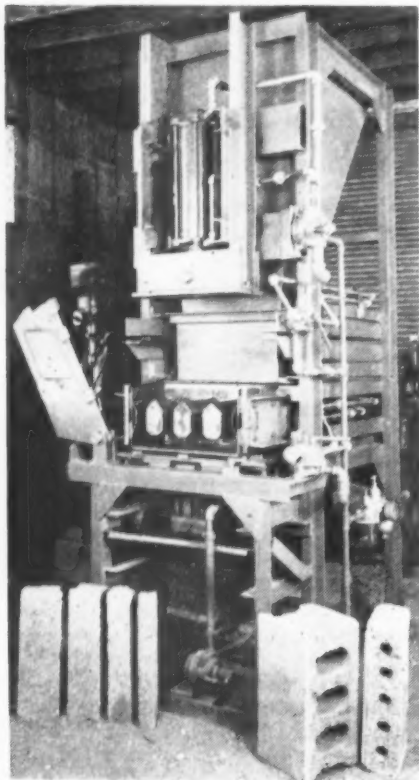
	Square Yards Awarded	
	During Mar. 1948	During First 3 Mos. 1948
Roads	2,654,072	5,118,348
Streets and Alleys ..	1,370,710	2,916,917
Airports	361,442	377,755
Total	4,386,224	8,413,020

Large Derrick Boat

WARNER Co., Philadelphia, Penn., is having a derrick boat hull constructed by the Dravo Corp., Pittsburgh, at its Neville Island shops. When completed, it will be shipped in sections to Van Seiver Lake.

Face Block Machine

ACME WELDING & ENGINEERING CO., Cudahy, Wis., has designed a face block machine, known as the Vibro-Blocker, for the manufacture of 4- x 8-in. block and filler block. Constructed of heavy welded steel sections, and hydraulically operated, the machine produces three to four block a minute. Steps in operation are as follows: form box is brought forward with the cores in a horizontal position, putting face of block at the bottom; loading hopper is brought forward by an air



Block machine and type of units it produces

valve, placing concrete in the form box; vibrator is started with a foot pedal; while vibrator is running the tamping fingers inside the loading hopper are brought down by a small lever, packing the concrete between the cores; loading hopper and form box are retracted and the block is completed.

Magnesium Pallets

ILLINOIS BRICK CO., Chicago, Ill., is using a new lightweight pallet.

Use of magnesium pallets at the Franklin Park plant is another indication of progressive thought on the part of management. These pallets, manufactured by Dow Chemical Co., are $\frac{3}{8}$ -in. in thickness and weigh 9 lbs. This change was made after a magnesium pallet had been used at Franklin Park for four years without requiring cleaning, and which showed no apparent pitting or other corrosion at the end of this time. Magnesium pallets weigh 29 lbs. less than steel pallets.

Two Valuable Aids For Determining Moisture Content

By R. R. KAUFMAN*

SOME concrete producers are content to take the average moisture content of the sand as four per cent. This arbitrary percentage is then used in batching the concrete regardless of whether the sand contains no moisture or 10 to 12 per cent. This practice is bad from two respects. First, the quality of the concrete cannot be up to the optimum standard, and second, unless the sand actually contains exactly four per cent moisture the resultant concrete mix will either produce less or more than one cu. yd.

As an example, assume that 1200 lbs. of sand is required per cu. yd. of concrete. It contains eight per cent of free water, which is four per cent more than assumed when an arbitrary four per cent moisture content is employed. This amounts to 48 lbs. of additional water. Therefore, it is readily noted that unless some correction is made, the cubic yard of concrete

which is produced will be deficient in yield equivalent to the space taken up by the 48 lbs. of water. This is equivalent to $\frac{1}{4}$ cu. ft.

On the other hand, if the sand is bone dry and the mixes made up with the assumption that sand contains four per cent moisture, then the mix will yield more than a cubic yard of concrete.

The former mix with eight per cent moisture will be under-sanded and harsh if the mix has been designed correctly with four per cent moisture in the sand, and in the latter case where the sand contains no moisture it will be over-sanded. In either case, the workability, cohesiveness, and strength secured will not coincide with the anticipated properties.

The Master Builders Co. has prepared and distributed to ready mixed concrete producers two charts which are valuable aids in assisting to correct and keep the mixes uniform. One is the Sand Moisture Determination

*Chief engineer, The Master Builders Co., Cleveland, Ohio.

SAND MOISTURE DETERMINATION CHART (CHAPMAN FLASK METHOD)

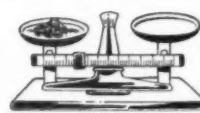
	TOTAL VOLUME	SPECIFIC GRAVITY OF SURFACE DRY SAND										TOTAL VOLUME	
		2.50	2.52	2.54	2.56	2.58	2.60	2.62	2.64	2.66	2.68		2.70
C H A P M A N	385											0.0	385
	386											0.3	386
	387										0.0	0.6	387
	388									0.0	0.3	1.0	388
	389								0.0	0.3	0.6	1.3	389
	390								0.3	0.6	1.0	1.7	390
	391							0.0	0.6	1.0	1.3	2.0	391
	392						0.0	0.3	1.0	1.3	1.7	2.3	392
	393						0.3	0.6	1.3	1.7	2.0	2.7	393
	394					0.0	0.6	1.0	1.7	2.0	2.3	3.0	394
F L A S K	395				0.0	0.3	1.0	1.3	2.0	2.3	2.7	3.3	395
	396				0.3	0.6	1.3	1.7	2.3	2.7	3.0	3.7	396
	397			0.0	0.6	1.0	1.7	2.0	2.7	3.0	3.3	4.0	397
	398		0.0	0.3	1.0	1.3	2.0	2.3	3.0	3.3	3.7	4.3	398
	399		0.3	0.6	1.3	1.7	2.3	2.7	3.3	3.7	4.0	4.7	399
	400	0.0	0.6	1.0	1.7	2.0	2.7	3.0	3.7	4.0	4.3	5.0	400
	401	0.3	1.0	1.3	2.0	2.3	3.0	3.3	4.0	4.3	4.7	5.3	401
	402	0.6	1.3	1.6	2.3	2.7	3.3	3.7	4.3	4.7	5.0	5.7	402
	403	1.0	1.6	2.0	2.7	3.0	3.7	4.0	4.7	5.0	5.3	6.0	403
	404	1.3	2.0	2.3	3.0	3.3	4.0	4.3	5.0	5.3	5.7	6.5	404
R E A D I N G	405	1.6	2.3	2.7	3.3	3.7	4.3	4.7	5.3	5.7	6.0	7.0	405
	406	2.0	2.7	3.0	3.7	4.0	4.7	5.0	5.7	6.0	6.5	7.3	406
	407	2.3	3.0	3.3	4.0	4.3	5.0	5.3	6.0	6.5	7.0	7.7	407
	408	2.7	3.3	3.7	4.3	4.7	5.3	5.7	6.5	7.0	7.3	8.0	408
	409	3.0	3.7	4.0	4.7	5.0	5.7	6.0	7.0	7.3	7.7	8.3	409
	410	3.3	4.0	4.3	5.0	5.3	6.0	6.5	7.3	7.7	8.0	8.7	410
	411	3.7	4.3	4.7	5.3	5.7	6.5	7.0	7.7	8.0	8.3	9.0	411
	412	4.0	4.7	5.0	5.7	6.0	7.0	7.3	8.0	8.3	8.7		412
	413	4.5	5.0	5.5	6.0	6.5	7.3	7.7	8.3	8.7	9.0		413
	414	5.0	5.5	6.0	6.5	7.0	7.7	8.0	8.7	9.0			414
	415	5.5	6.0	6.5	7.0	7.3	8.0	8.5	9.0				415
	416	6.0	6.5	7.0	7.3	7.7	8.5	9.0					416
	417	6.5	7.0	7.3	7.7	8.0	9.0						417
	418	7.0	7.3	7.7	8.0	8.5							418
	419	7.3	7.7	8.0	8.5	9.0							419
	420	7.7	8.0	8.5	9.0								420
	421	8.0	8.5	9.0									421



CHAPMAN FLASK

PROCEDURE FOR MOISTURE DETERMINATION (Specific Gravity Must Be Known)

- Fill Chapman flask with water to 200 cubic centimeter mark.
- Weigh 500 grams of the sand, the moisture of which is being determined.
- Transfer the sand from balance pan into Chapman flask using wide mouth funnel. Brush sand from pan and funnel into flask.
- Wet the palm of your hand and hold it tightly over mouth of flask, shaking flask to dislodge entrapped air bubbles.
- Read final level of water in flask. Disregard any foam that might form.
- From the above chart determine % moisture in sand by looking down the column giving specific gravity of sand until you arrive at the figure opposite the flask reading.
- Use this moisture content for making the corrections in mix design given in the "Concrete Sand Moisture Correcting Table."



HARVARD BALANCE
(500 GRAM CAPACITY)
(1 GRAM SENSITIVITY)

Chart for determining moisture in sand by the Chapman flask method

Chart, and the other is the Concrete Sand Moisture Correcting Table, illustrated herewith. The Sand Moisture Determination Chart employs a Chapman Flask, together with a Harvard Balance. This is a quick method for determining the moisture in sand.

Moisture Correcting Table

After the moisture content of the sand has been determined, reference is made to the Concrete Sand Moisture Correcting Table. This table enables the operator to determine the amount

of sand to add and number of gallons or pounds of water to deduct from his mix for all percentages of moisture from one per cent to eight per cent. This chart also covers a range of weights of sand in the mix from 600 lbs. to 8000 lbs.

The use of this method and these tables will result in a much better quality concrete, and will effectively save much more for the producer than the cost of making such determinations and corrections.

Slag Firm Expands

STANDARD SLAG Co., Youngstown, Ohio, has purchased 144 acres of land adjacent to its slag dump along the Baltimore and Ohio Railroad lines east of Newton Falls. The company already owns 200 acres of land at this site, which is now covered with millions of tons of slag from the Youngstown district blast furnaces. One or more trainloads of new material arrive daily.

CONCRETE SAND MOISTURE CORRECTING TABLE

Design Weight of Sand	1% MOISTURE			2% MOISTURE			3% MOISTURE			4% MOISTURE			5% MOISTURE			6% MOISTURE			7% MOISTURE			8% MOISTURE			Design Weight of Sand
	Add Lbs. Sand	Deduct Water Gals.	Deduct Water Lbs.	Add Lbs. Sand	Deduct Water Gals.	Deduct Water Lbs.	Add Lbs. Sand	Deduct Water Gals.	Deduct Water Lbs.	Add Lbs. Sand	Deduct Water Gals.	Deduct Water Lbs.	Add Lbs. Sand	Deduct Water Gals.	Deduct Water Lbs.	Add Lbs. Sand	Deduct Water Gals.	Deduct Water Lbs.	Add Lbs. Sand	Deduct Water Gals.	Deduct Water Lbs.	Add Lbs. Sand	Deduct Water Gals.	Deduct Water Lbs.	
600	6	1	8	12	1	8	18	2	17	24	3	25	30	4	33	36	4	33	42	5	42	48	6	50	600
700	7	1	8	14	2	17	21	3	25	28	3	25	35	4	33	42	5	42	49	6	50	56	7	58	700
800	8	1	8	16	2	17	24	3	25	32	4	33	40	5	42	48	6	50	56	7	58	64	8	67	800
900	9	1	8	18	2	17	27	3	25	36	4	33	45	5	42	54	6	50	63	8	67	72	9	75	900
1000	10	1	8	20	2	17	30	4	33	40	5	42	50	6	50	60	7	58	70	8	67	80	10	83	1000
1100	11	1	8	22	3	25	33	4	33	44	5	42	55	6	50	66	8	65	77	9	75	88	11	92	1100
1200	12	1	8	24	3	25	36	4	33	48	6	50	60	7	58	72	9	75	84	10	83	96	11	92	1200
1300	13	1	8	26	3	25	39	5	42	52	6	50	65	8	67	78	9	75	91	11	92	104	12	100	1300
1400	14	1	8	28	3	25	42	5	42	56	7	58	70	8	67	84	10	83	98	12	100	112	13	108	1400
1500	15	2	17	30	3	25	45	5	42	60	7	58	75	9	75	90	11	92	105	13	108	120	14	117	1500
1600	16	2	17	32	4	33	48	6	50	64	8	67	80	10	83	96	12	100	112	14	117	128	15	125	1600
1700	17	2	17	34	4	33	51	6	50	68	8	67	85	10	83	102	12	100	119	14	117	136	16	133	1700
1800	18	2	17	36	4	33	54	6	50	72	9	75	90	11	92	108	13	108	126	15	125	144	17	142	1800
1900	19	2	17	38	4	33	57	7	58	76	9	75	95	11	92	114	14	117	133	16	133	152	18	150	1900
2000	20	2	17	40	5	42	60	7	58	80	10	83	100	12	100	120	14	117	140	17	142	160	19	158	2000
2100	21	2	17	42	5	42	63	8	67	84	10	83	105	13	108	126	15	125	147	18	150	168	20	167	2100
2200	22	3	25	44	5	42	66	8	67	88	11	92	110	13	108	132	15	125	154	18	150	176	21	175	2200
2300	23	3	25	46	6	50	69	8	67	92	11	92	115	14	117	138	16	133	161	19	158	184	22	185	2300
2400	24	3	25	48	6	50	72	9	75	96	12	100	120	14	117	144	17	142	168	20	167	192	23	192	2400
2500	25	3	25	50	6	50	75	9	75	100	12	100	125	15	125	150	18	150	175	21	175	200	24	200	2500
2600	26	3	25	52	6	50	78	9	75	104	13	108	130	15	125	156	19	158	182	22	185	208	25	208	2600
2700	27	3	25	54	6	50	81	10	83	108	13	108	135	16	133	162	19	158	189	23	192	216	26	217	2700
2800	28	3	25	56	7	58	84	10	83	112	13	108	140	16	133	168	20	167	196	23	192	224	27	224	2800
2900	29	3	25	58	7	58	87	10	83	116	14	117	145	17	142	174	20	167	203	24	200	232	28	234	2900
3000	30	4	33	60	7	58	90	11	92	120	14	117	150	18	150	180	21	175	210	25	208	240	29	242	3000
3100	31	4	33	62	7	58	93	11	92	124	15	125	155	18	150	186	22	183	217	26	217	248	30	250	3100
3200	32	4	33	64	8	67	96	12	100	128	15	125	160	19	158	192	23	192	224	27	224	256	31	258	3200
3300	33	4	33	66	8	67	99	12	100	132	16	133	165	20	167	198	24	200	231	28	234	264	32	267	3300
3400	34	4	33	68	8	67	102	12	100	136	16	133	170	20	167	204	25	208	238	29	242	272	33	275	3400
3500	35	4	33	70	8	67	105	13	108	140	17	142	175	21	175	210	25	208	245	29	242	280	34	283	3500
3600	36	4	33	72	9	75	108	13	108	144	17	142	180	21	175	216	26	217	252	30	250	288	35	292	3600
3700	37	4	33	74	9	75	111	13	108	148	18	150	185	22	183	222	26	217	259	31	258	296	36	300	3700
3800	38	5	42	76	9	75	114	14	117	152	18	150	190	22	183	228	27	224	266	32	267	304	37	308	3800
3900	39	5	42	78	9	75	117	14	117	156	19	158	195	23	192	234	28	234	273	33	275	312	38	317	3900
4000	40	5	42	80	9	75	120	14	117	160	19	158	200	24	200	240	29	242	280	34	285	320	39	325	4000
4100	41	5	42	82	10	83	123	15	125	164	20	167	205	24	200	246	30	250	287	35	292	328	40	333	4100
4200	42	5	42	84	10	83	126	15	125	168	20	167	210	25	208	252	30	250	294	35	292	336	41	342	4200
4300	43	5	42	86	10	83	129	16	133	172	21	175	215	26	217	258	31	258	301	36	300	344	42	350	4300
4400	44	5	42	88	10	83	132	16	133	176	21	175	220	26	217	264	32	267	308	37	308	352	43	358	4400
4500	45	5	42	90	11	92	135	16	133	180	21	175	225	27	224	270	32	267	315	38	317	360	44	367	4500
4600	46	6	50	92	11	92	138	17	142	184	22	183	230	27	224	276	33	275	322	39	325	368	45	375	4600
4700	47	6	50	94	11	92	141	17	142	188	22	183	235	28	234	282	34	283	329	40	333	376	46	383	4700
4800	48	6	50	96	12	100	144	17	142	192	23	192	240	29	242	288	35	292	336	41	342	384	47	392	4800
4900	49	6	50	98	12	100	147	18	150	196	23	192	245	30	250	294	36	300	343	41	350	392	48	400	4900
5000	50	6	50	100	12	100	150	18	150	200	24	200	250	30	250	300	37	308	350	42	350	400	48	400	5000
5100	51	6	50	102	12	100	153	18	150	204	24	200	255	31	258	306	37	308	357	43	358	408	49	408	5100
5200	52	6	50	104	13	108	156	19	158	208	25	208	260	31	258	312	38	317	364	43	358	416	50	416	5200
5300	53	6	50	106	13	108	159	19	158	212	25	208	265	32	267	318	38	317	371	44	367	424	51	425	5300
5400	54	6	50	108	13	108	162	19	158	216	26	217	270	32	267	324	39	325	378	45	375	432	52	433	5400
5500	55	7	58	110	13	108	165	20	167	220	26	217	275	33	275	330	39	325	385	46	383	440	53	441	5500
5600	56	7	58	112	14	117	168	20	167	224	27	224	280	34	285	336	41	342	392	47	392	448	54	450	5600
5700	57	7	58	114	14	117	171	20	167	228	27	224	285	34	285	342	42	350	399	48	400	456	55	458	5700
5800	58	7	58	116	14	117	174	21	175	232	28	234	290	35	292	348	42	350	406	48	400	464	56	466	5800
5900	59	7	58	118	14	117	177	21	175	236	28	234	295	35	292	354	43	358	413	49	408	472	57	475	5900
6000	60	7	58	120																					

300 BLOCKS per HOUR

"Push-Button Cycle-Control"

• • WITH THE • •

KENT VIBRA-TAMP

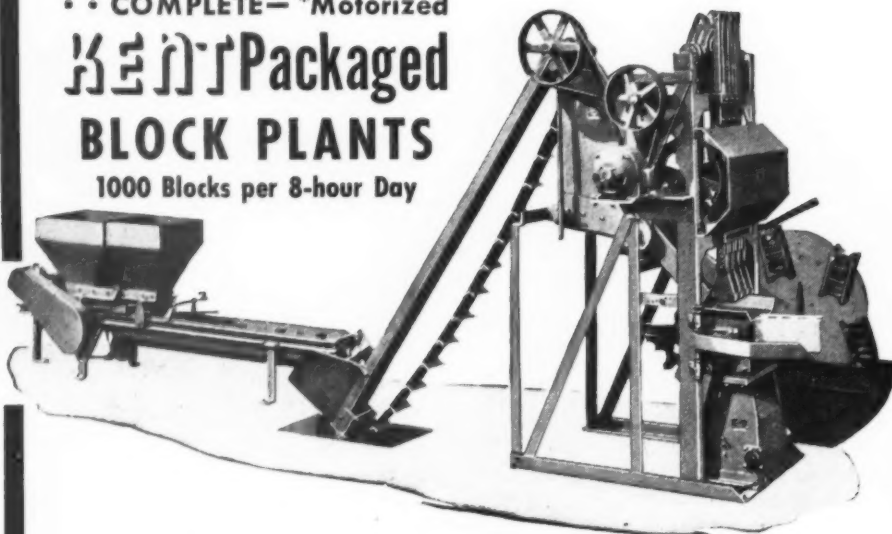
• A complete automatic cycle block maker combining vibration and tamping that responds to "PUSH-BUTTON CONTROL" and produces 300 quality blocks per hour. A rugged machine unexcelled in design, principle of operation and performance. Write for the illustrated Vibra-Tamp circular.



• • COMPLETE— *Motorized

KENT Packaged BLOCK PLANTS

1000 Blocks per 8-hour Day



• The KENT Continuous Mixer delivers well-mixed concrete in a steady stream to the KENT Elevator which raises it to the KENT Feeder. From this the concrete flows into the easily operated KENT Stripper. The pull of a lever brings the KENT Tamper into operation for speedy tamping of dense block.

*Larger KENT plants are available; also units for belt drive and combinations having the KENT Batch Mixer, instead

The hopper "strikes-off" the blocks smoothly. It is then raised by an easily operated lever and swung to one side on the "take-off". At the right of the stripper stands the KENT Dunker which keeps pallets constantly in fine condition. Furnished with 1000 pallets, 25 three-deck curing racks and lift truck.



of the Continuous Mixer. Use the coupon below to obtain any desired information quickly and easily.

The KENT MACHINE COMPANY

Manufacturers of CONCRETE PRODUCTS MACHINERY Since 1925

CUYAHOGA FALLS, OHIO, U.S.A.

Send complete information and prices as checked below.

☐ Plant illustrated above

☐ Plant with Batch Mixer

☐ Plant with belt drive

☐ Larger Complete Plants

Name..... Address.....

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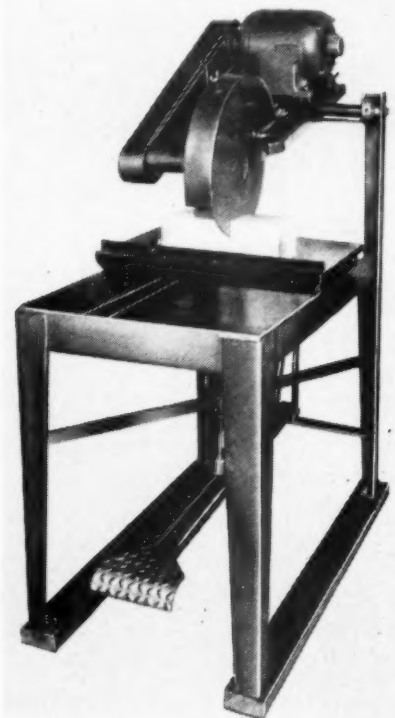
City

Masonry Saw

THE CHAMPION MANUFACTURING Co., St. Louis, Mo., has announced the Model R masonry cutting saw. This model is universal in its application in that it can be used as either a wet cutting or dry cutting saw. A 1½-hp. totally enclosed, ball bearing motor supplies sufficient power for cutting the hardest materials, according to the manufacturer. Either abrasive masonry cutting blades or diamond blades can be used.

The cutting head of the machine can be controlled by means of a foot pedal, if desired, or the head can be locked down tight for either cutting or scoring. The new model has a self-priming centrifugal pump, with a self-contained water system, requiring no outside hose connections or drains. The pump has a rubber impeller, and is designed to pump the dust and grit picked up by the coolant. Water is used as a coolant, except when a chemically bonded brick is cut.

All belts are covered, and the blade guard is designed to provide maxi-



Masonry saw has sealed conveyor cart bearing to guard against moisture or corrosion

mum protection for the operator. The blade guard is hinged, and is easily thrown back for quick installation or removal of the blade.

For abrasive cutting, the company recommends its "Jade" blades for the new model. The Company, D-250, a segmented diamond blade; or the D-100, a kerfed diamond blade is recommended for cutting dense hard ceramic materials having a fine aggregate.

TEX-MEX CEMENT Co., Dover, Del., has been granted articles of incorporation with a capital of 20,000 shares, no par value.

German Precast Concrete

By DR. F. O. ANDEREGG

ABOUT a year ago MACK A. ARNOLD and OTTO L. FORMIGLI toured Germany to study the cement products industry and their report from the Office of Military Government for Germany, V.S. is FIAT Final Report No. 1123.

The current lack of wood and steel has given a tremendous impetus to this industry in Germany and to the development of prestressed members. With the latter, as little as 0.2 per cent steel in the shape of special heat-treated wires of from 0.05 to .10 in. in diameter are used. Frequently these are twisted into pairs to reduce slip. The load carrying members are made of excellent concrete which is placed rather dry around wires stretched very tightly in the forms, and is then vibrated or tamped into place. Various shaped joists are used, the commonest being an inverted T shape, between which smaller slabs are placed which are often produced at the site from the rubble resulting from the war-time demolition. Over the whole deck a slab of concrete could be cast, or the joints might be simply filled in. The under side is usually plastered directly.

Where the old wall is sufficiently substantial, the joist would be placed directly thereon; if not, it has sometimes been necessary to cast a concrete girder as part of the wall to carry the ends of the joists. These means have permitted eliminating form lumber, while the steel has been reduced to a minimum.

Floor Slab Machine

A very interesting development is the Schaeffer machine for the manufacture of floor slabs. These are sandwich members with cored lightweight concrete in the center having from 1- to 1½-in. highest quality gravel concrete on the top and bottom surfaces. First high-yield steel wires are stretched in very long forms. Then a machine comes along and places the first layer of high strength concrete and tamps or vibrates it into place, with greatest care to get thorough contact with the wire. Then lightweight concrete is placed to fill the bulk of the thickness. In this, rubber tubes are placed, for the cores desired. A few more wires are stretched and another layer of gravel concrete is vibrated into place. Sand is then sprinkled over this slab and other slabs are successively cast. One day's work will fill one alley. After 14 days the slabs are cut to the right length with a carborundum saw and taken to stockpile storage, where they are placed bottom side up. Using from 0.1 to 0.2 per cent steel, very effectively designed members are obtained for housing. A little steel is placed in the top layer to prevent excessive camber-

ing and to allow handling. These machines cost about \$90,000 and the results obtained suggest their application for American practice, with suitable modifications.

Prestressed Concrete Rafters

Prestressed members are made up for rafter and various cement tiles have been designed to cover the same. Rafter pitches are rather steep, as is common for tile roofs. Two model houses are described and several special sections discuss briefly railroad ties, concrete bridges, and conduit tile; while a special section by Gerhard Frenkel of Ruedersdorf describes Gas and Foam Concrete. The information contained in this last section is similar to that reviewed by the writer from a publication by Prof. Otto Graf. One point contained therein might receive emphasis—the great shrinkage encountered where wood fibers are included in cement concrete.

Concrete Products Washington Meeting

OPENING at 1:30 p.m., the last quarterly meeting of the Concrete Products Association of Washington, Seattle, began with a description of the vacuum process used at the Shearman Concrete Pipe Co., Oklahoma City, Okla., and described in ROCK PRODUCTS, January, 1948. This was followed by a summary of the highlights of the New Orleans meeting.

A colored motion picture, taken by the Washington State Game Commission, was presented, showing herds of elk and deer being fed in the mountains in time of deep snow, and a cougar hunt.

E. L. WARNER, manager of the Harrison Pipe Co., Tacoma, gave a talk on "Selling Methods in the Concrete Products Industry," emphasizing first,

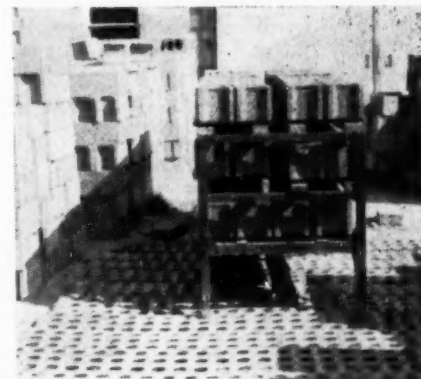
the need of quality products, and second, the value of friends in selling. He discussed the difference between business taken by "signing on the dotted line" and that received as a result of confidence in the seller and product.

R. J. Cotter outlined the use of concrete masonry in the State of Washington with particular emphasis on the use of concrete masonry in the current construction program at the University of Washington, and illustrated his talk with projected photographs.

Buildings at the University are of reinforced concrete with brick exterior and with concrete masonry backup and partition tile, the latter being 4- x 8- x 16-in. concrete masonry block without plaster. A pumice concrete floor tile is being used extensively in the new Medical-Dental Center.

Landing Mat Roadway

MORRIS WRECKING & SALVAGE CO., Dayton, Ohio, has produced a landing mat said to be especially useful for



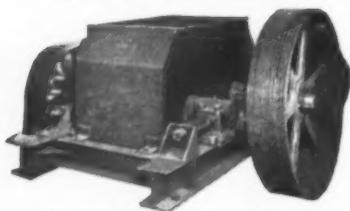
Landing mats being used on runway in block plant storage yard

roadways and runways in and about plants in the rock products industry. The government has used the mats to haul equipment and for setting up in many operations when the ground was soft.



New officers of the American Concrete Pipe Association. Left to right: Erl H. Eby, Elk River Concrete Products Co. of Montana, Helena, Mont., 3rd vice-president; H. W. Heath, Lock Joint Pipe Co., East Orange, N. J., 1st vice-president; J. A. Dunn, Hume Pipe Co. of New England, Swampscott, Mass., president; C. H. Bullen, Midway Concrete Pipe Co., Chicago, Ill., treasurer; George Denham, Faulkner Concrete Pipe Co., Hattiesburg, Miss., secretary; and Claude Kelly, New Orleans Cement Products Co., New Orleans, La., 2nd vice-president

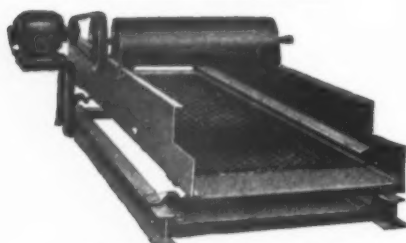
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ton per hour
capacity
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Makes a test for
moisture content of
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gregates in ONE min-
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Delivers correct DRY
weight of wet ag-
gregates and ADDED
water without calcu-
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Lift Truck with Cab

CLARK EQUIPMENT CO., Trucktrac-
tor Division, Battle Creek, Mich., has
equipped its Yardlift-40 fork truck



Lift truck equipped with insulated cab

with a welded steel, sound-insulated,
all-weather cab. The cab is fully en-
closed, with entrance door on the
driver side. It is equipped with sliding
windows, safety glass throughout, and
an upper window of glare-proof glass
to aid high stacking. Rear-view mirror
and windshield wiper are standard
equipment, and a hot water heater is
available as extra.

Fleet Maintenance Garage

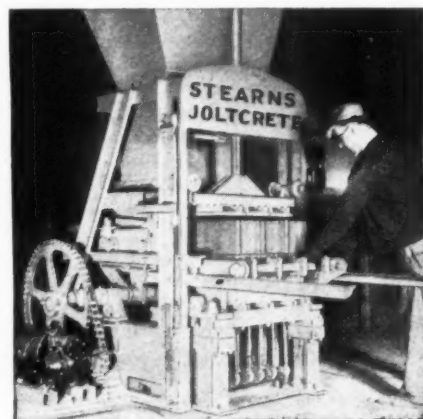
WARNER Co., Philadelphia, Penn.,
maintains a complete garage for re-
pair and maintenance work on its fleet
of trucks used to distribute sand and
gravel and ready mixed concrete. A
large part of this fleet is comprised
of 150 agitator trucks. Preston W.
Smither, truck superintendent, is in
charge of the garage and related
shops. There are roughly five divi-
sions: mechanical, paint shop, tire
repair, parts department, and office
records.

The mechanical shop is well
equipped and handles all work from
minor repairs to major overhauls, mo-
tor rebuilding and frame repair. En-
tire trucks and agitator bodies are
cleaned and painted periodically in
the paint shop. Tires in use and stor-
age total 1800, making the job of the
tire shop an important one. A large
stock department is kept well supplied
by means of a continuous inventory

card system, and the office handles all
records of the garage and individual
trucks as well as personnel records of
drivers, including first aid and acci-
dent reports.

Adds to Packing Facilities

NAZARETH CEMENT Co., Nazareth,
Penn., in its annual report, stated
that plant improvements during 1947
included additions to packing and
loading facilities and to conveying
equipment. Appropriations for 1948
include installation of dust collection
equipment on several operations, pri-
marily kilns and rock dryers. Two
Diesel truck units will be purchased
for work at the quarry, proven re-



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Equipment for all phases of manufac-
turing concrete cinder block and other
lightweight aggregate units. Our en-
gineering service for new plants and
modernizing old ones will help you
operate more economically.

Stearns Clipper Stripper Machines;
Stearns Joltcrete Machines; Stearns
Mixers; Cast Iron and Press Steel
pallets. Straublox Oscillating At-
tachments, etc.

Repair parts for: Anchor, Stearns,
Blystone Mixers and many others.

Anchor Concrete Mch. Co.

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WIREGRIP precision made Belt Hooks come with
extra (patented) blue aligning cards—are held
more rigid, assuring perfect alignment of hooks
—less hook loss from handling—a better job
when applied with any make lacing machine.
6 sizes.

STEELGRIP Flexible Lacing, applied with a ham-
mer, clinches over and protects end of belt.
Makes strong, flexible joints. Boxed with 2-piece
hinged rocker pins or can be obtained in long
lengths for conveyor belt use.

ARMSTRONG-BRAY & CO.

The Belt Lacing People

5366 Northwest Hwy., Chicago, Ill.

serves of which indicate approximately 100 years' supply at present rate of operations.

Portland Cement Production

PRODUCTION of portland cement in January, 1948, as reported to the Bureau of Mines, was 14,541,000 bbls., eight per cent above that reported for January, 1947. Seventy-one per cent of capacity was utilized, an increase of five per cent over that reported for the same month of 1947. Mill shipments reached 9,205,000 bbls. in January, 1948, an increase of 10 per cent over that reported for January, 1947. Stocks of 15,311,000 bbls. on January 31, 1948, were four per cent below those reported for January, 1947. Clinker output in January, 1948, reached 15,455,000 bbls., an increase of eight per cent over that reported for January, 1947.

	RATIO (PER CENT) OF PRODUCTION TO CAPACITY				
	Jan. 1948	Jan. 1947	Dec. 1947	Nov. 1947	Oct. 1947
The month	71.0	66.0	79.0	85.0	90.0
12 months	78.0	70.0	78.0	77.0	77.0

ATLAS UNIVERSAL CEMENT CO., Osborn, Ohio, recently reported loss of several sticks of dynamite and several thousand fuse caps when two storage magazines, located on company grounds, were broken into. Two days later, a safe-cracking job in nearby Dayton, Ohio, was believed to be the work of the same gang.

New Uses For Vermiculite Concrete

PROCESSORS of vermiculite from all sections of the United States and Canada attended the annual meeting of the Vermiculite Institute, at the Plaza Hotel, San Antonio, Texas, March 22-25. Practically every distributor in the industry was represented. Shelton W. Greer, Vermiculite Products Corp., Houston, and R. H. Rice, Mineral Products, San Antonio, acted as co-hosts.

At the business session, which opened the meeting, new officers of the Institute were elected: President, L. J. Venard, Western Mineral Products Co., Minneapolis; Treasurer, W. J. Bein, Zonolite Co., Chicago; Executive Secretary, E. R. Murphy, Vermiculite Institute headquarters, Evanston, Ill. The new Board of Directors are: W. J. Bein, Zonolite Co., Chicago; M. D. Muttart, Insulation Industries, Ltd., Edmonton, Alberta, Canada; R. H. Rice, Mineral Products, San Antonio; F. H. Robinson, Robinson Insulation Co., Great Falls, Mont.; L. J. Venard, Western Mineral Products Co., Minneapolis.

Two new and important committees were appointed: a Planning Committee of five members, with G. R. Stark, B. F. Nelson Mfg. Co., Minneapolis, chairman; and a Standardization Committee, also five members, of

which C. A. Pratt, Western Mineral Products Co., is chairman. The Planning Committee will plan the testing program for Vermiculite Institute, and make recommendations regarding Institute specifications. This committee will also study and make recommendations for other organizational work. The Standardization Committee will study processing techniques throughout the industry, with a view of improving standardization of all vermiculite products.

The Tuesday and Wednesday sessions were devoted to technical papers and discussions. Guest speaker was T. R. HIGGINS, Director of Engineering, American Institute of Steel Construction, New York City, who spoke on fireproofing structural steel columns with vermiculite plaster.

"For the past two years," Mr. Higgins said, "the American Institute of Steel Construction has been carrying on a series of fire tests on structural steel columns fireproofed with various lath and plaster constructions. We have been prompted to do this for several reasons. In the first place, there have been almost no fire tests run on protections for steel columns for the last twenty-five or thirty years. In that time, many improve-



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Starred!

for **COLOR
BEAUTY
DURABILITY
ECONOMY**

An old-established British Engineering Firm, Inventors and Builders of Machinery for Concrete Shingle and Tile Production, offer manufacturing rights to American and Canadian Companies. The equipment produces up to four thousand pieces an hour and interlocking, Marseille, Pan tiles and Broseley patterns can be made. Complete production data, working drawings and prototype available.

A BUSINESS OPPORTUNITY.

W. L. James, Chairman and Managing Director, visiting America, May 1948, can be contacted at Rock Products Office, by interested parties.

Announcement by
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ments have been offered, both in materials and construction methods; but these newer developments have been under a handicap in many cases because of antiquated building codes.

"Moreover, in the typical light occupancy type of building, the loss of space occasioned by larger-than-necessary columns and thicker-than-necessary partitions can become a serious objection, particularly in hotel and apartment house construction where the total floor area is considerably sub-divided into relatively small rooms. This has given impetus to the use of 2-in. solid plaster partitions, with which a plaster enclosure of the supporting columns ties in very nicely. Too, the elimination of masonry furring not only reduces the space consumed by columns, but cost studies indicate should effect an over-all saving, as well."

Vermiculite Concrete

Wednesday's session was devoted to a discussion of vermiculite insulating concrete. Dayton L. Prouty, Zonolite Co., Detroit, presented a paper on the use of vermiculite insulating concrete sub-slabs for radiant heated and ground floors, as a means of reducing heat losses to the ground.

S. L. DUEGER, Zonolite Co., Chicago, discussed vermiculite in brewery construction as a lightweight, permanent material for insulating floors, tanks, and roofs. Other speakers were H. K.

Sterrett, Southern Zonolite Co., Atlanta, Ga.; Glenn Sucetti, Universal Insulation Co., Sacramento, Calif.; R. F. Rea, Zonolite Co., Chicago; and C. H. Jefferson, Vermiculite Institute, Evanston, Ill.

At the annual banquet held at the Plaza Hotel on Wednesday evening, outgoing president of Vermiculite Institute, GLENN SUCETTI, was presented with a matched gold pen and pencil set as a token of appreciation of his past services.

Refrigeration Insulation

On Thursday morning, C. K. DUNCAN, Robinson Insulation Co., Great Falls, Mont., presented data on a study made over a ten year period of operating costs in seventeen locker plants of comparable size, selected at random in Montana. Seven of these plants had been insulated with vermiculite refrigeration fill; the balance, with other insulation materials. The study disclosed that the average operating cost per year per individual locker insulated with vermiculite was 17¢, compared with an average of 32¢ for other insulations.

S. K. ROBINSON, F. Hyde & Co., Montreal, Quebec, reported on results secured with vermiculite insulating fill in reducing seasonal losses in natural ice storage buildings. In one such structure, the seasonal loss of ice was reduced from 600 to 200 tons per year by insulating a portion of the building

with vermiculite fill. Mr. Robinson pointed out that had the entire building been similarly insulated, the saving would have been even more spectacular.

E. R. MURPHY, executive secretary of the Institute, announced that the organization is now preparing booklets on vermiculite concrete and plaster, and other folders covering the entire range of vermiculite products. These will be distributed to architects, engineers, building officials, lumber and building materials dealers, and the construction industry generally.

The meeting was adjourned at noon on Thursday. Members and their wives were taken to the luxurious Flying L dude ranch at Bandera, fifty miles north of San Antonio, where a rodeo and barbecue had been arranged. Perfect weather encouraged use of the ranch's golf links, saddle horses, and swimming pool.

Also on Tuesday's program was HAROLD STRAND, B. F. Nelson Mfg. Co., Minneapolis, whose subject was vermiculite acoustical plastic for sound correction. The Tuesday session was terminated at noon in order that members might avail themselves of an invitation extended by the United States Army Post at Fort Sam Houston to have lunch and inspect the post.

PERMANENTE CEMENT Co., San Francisco, Calif., has announced a cement price increase of 30¢ per barrel to \$2.45 f.o.b. net.

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Rubber turns a mountain inside out

A typical example of B. F. Goodrich development in rubber

THE Navy dug 20 holes, each one so big you could have built a 25-story office building inside it. They literally hauled out the insides of a hill to make bomb-proof fuel tanks (Pearl Harbor happened in the midst of the job) and did it in record time because of rubber.

As fast as dirt and rocks (some of them boulders 4 feet wide) were blasted out, rubber belts carried them out and away. But 4-foot boulders would tear and break the stiff woven fabric of ordinary conveyor belts.

B. F. Goodrich had developed a new

type of belt in which cords carry the load, each cord encased in elastic rubber to take up the loading shock and immediately snap back into carrying position.

These new B. F. Goodrich belts were installed on the Navy job. They carried out a mountain of earth—3½ million tons—and were still in such good shape most of them were installed on other jobs and are still at work.

This new-type BFG cord belt is setting new records in many other places, too—coal mines, ore mines, construction work of all kinds. In some cases it

has lasted 10 times as long as former belts.

Belting is only one of hundreds of products for industry which B. F. Goodrich research has improved. Others are tank lining, rubber bearings, work clothing, rubber springs, hose for acid, air, oil, hydraulic fluids, etc. Whatever your use of rubber, it pays to ask your distributor to show you the improvements B. F. Goodrich has made in it—recently. The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.

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